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EFFECT OF MULTIAXIAL LOADING ON CRACK GROWTH

Volume III - Compilation of Interferometry Photographs

A. F. LIU
D. F. DITTMER

NORTHROP CORPORATION
AIRCRAFT GROUP
HAWTHORNE, CALIFORNIA 90250

December 1978

FINAL REPORT

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) An exploratory research program has been conducted to systematically evaluate the effects of biaxial stress ratio on constant amplitude and variable amplitude fatigue crack growth rates. A series of experiments and analyses have been carried out on the cyclic crack growth behavior of center-cracked cruciform specimens under various biaxial loading conditions. The results may be summarized as follows.		

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Block No. 20 (continued)

1. Crack will grow straight in a biaxial stress field when the stress component parallel to the crack is equal to or smaller than the stress component normal to the crack.
2. Elastic K factors are obtainable for both straight and curved cracks and are adequate for correlating the biaxial crack growth rate data.
3. At a given stress intensity level the constant amplitude crack growth rates are the same in all the biaxial loading conditions.
4. In out-of-phase loading conditions the crack growth rate and crack growth directions are the same as those in the in-phase loading condition.
5. Crack tip plastic zone size variations with biaxial ratio appeared to have no effect on constant amplitude crack growth rate.
6. As for the variable amplitude tests, it is very evident that cracks grow faster at positive biaxial stress states but slower at negative biaxial loading conditions.

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FOREWORD

This report describes results of work performed by the Northrop Corporation, Aircraft Group, Hawthorne, California, under Air Force Contract F33615-76-C-3121, "Effect of Multiaxial Loading on Crack Growth," Project 486U, "Advanced Metallic Structures - Advanced Development Program," Task 486U02, work unit 486U0224. The effort was sponsored by the Air Force Flight Dynamics Laboratory, Air Force Wright Aeronautical Laboratories, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio. Captains John E. Allison and Donald R. Holloway of the AFFDL/FBE were the Air Force Project Engineers.

The program was performed by the Structures Research Department of Northrop Corporation, Aircraft Group, under the overall supervision of L. L. Jeans, Manager, Structural Life Assurance Research. Mr. A. F. Liu was the Northrop Program Manager and Principal Investigator. He was assisted by D. F. Dittmer on experimental tasks; J. R. Yamane, Dr. J. P. Buban, and Dr. H. P. Kan on analytical tasks. Dr. M. M. Ratwani provided guidance on cracked finite element analysis.

This report covers work accomplished during the period September 1976 through September 1978. This report consists of three volumes.

- Volume I Technical Summary
- Volume II Compilation of Experimental Data
- Volume III Compilation of Interferometry Photographs

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SECTION I

COMPILED OF INTERFEROMETRY PHOTOGRAPHS

This volume of the report compiles all 170 interferometry photographs taken from 30 cruciform specimens. These photographs were taken from three groups of specimens as listed:

1. Constant Amplitude (Figures 1 through 90)
2. Single Overload (Figures 91 through 130)
3. Constant Amplitude, Out-of-Phase (Figures 131 through 170)

The photographs were taken at zero load (after unloaded from the stress levels indicated in the figure) or at peak load conditions. The loading conditions and crack size while the picture was taken are identified and noted on each photograph.

7075-T7351, $a = 0.25$ inch
 $\sigma_x = 0$, $\sigma_y = 12$ ksi unloaded
Magnification: 45.2X
Test Case 8
Specimen 7-1-1

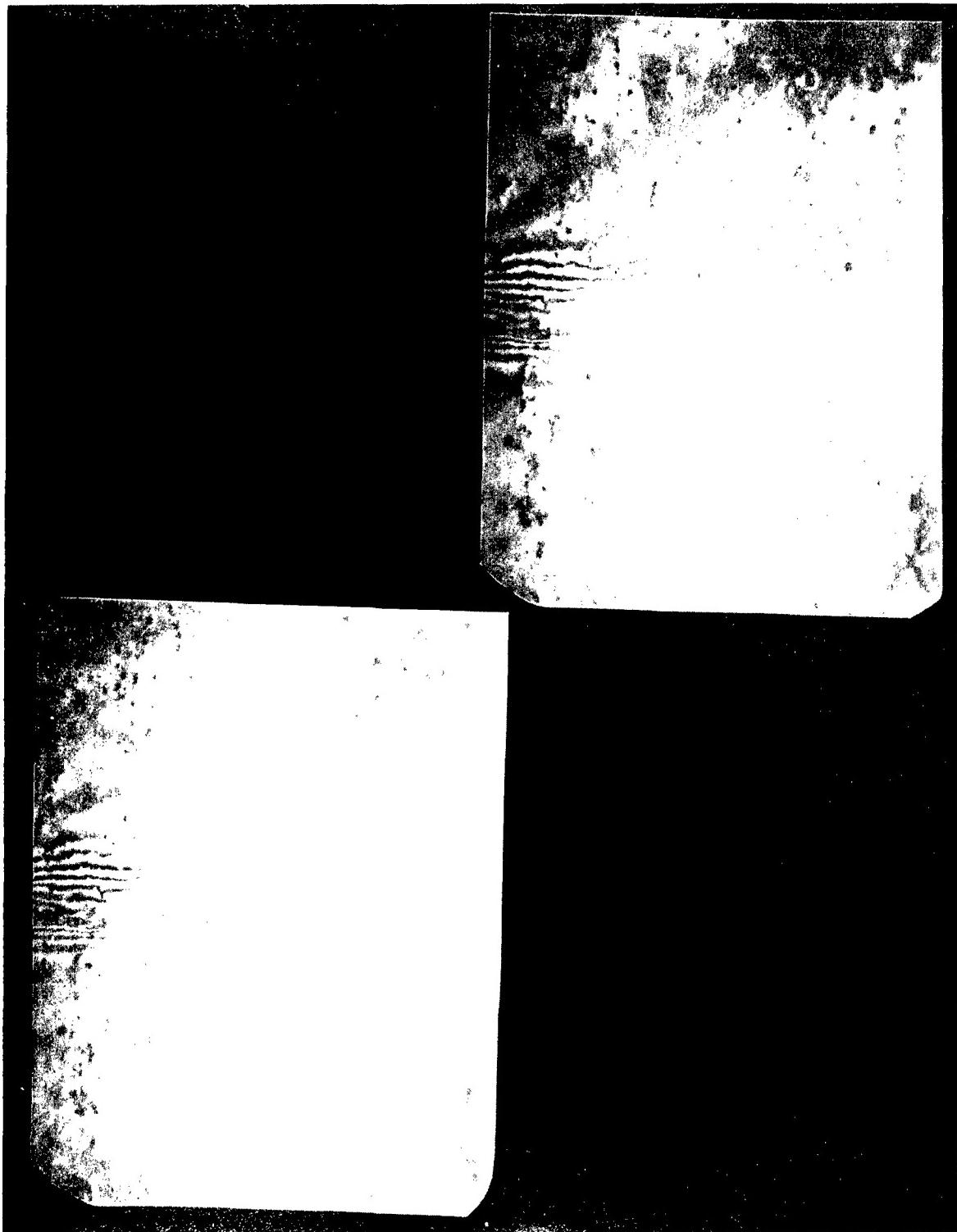


Figure 1. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.505$ inch
 $\sigma_x = 0$, $\sigma_y = 12$ ksi unloaded
Magnification: 49.5X
Test Case 8
Specimen 7-1-2



Figure 2. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.75$ inch
 $\sigma_x = 0$, $\sigma_y = 12$ ksi unloaded
Magnification: 46.1X
Test Case 8
Specimen 7-1-3



Figure 3. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 1.00$ inch
 $\sigma_x = 0$, $\sigma_y = 12$ ksi unloaded
Magnification: 47.9X
Test Case 8
Specimen 7-1-4



Figure 4. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.510$ inch
 $\sigma_x = 0$, $\sigma_y = 12$ ksi unloaded
Magnification: 45.8X
Test Case 11
Specimen - 7-51-1



Figure 5. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.510$ inch
 $\sigma_x = 0$, $\sigma_y = 12$ ksi at load
Magnification: 46.7X
Test Case 11
Specimen - 7-51-2.1



Figure 6. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.510$ inch
 $\sigma_x = 0$, $\sigma_y = 12$ ksi at load
Magnification: 45.2X
Test Case 11
Specimen - 7-51-2.2



Figure 7. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.760$ inch
 $\sigma_x = 0$, $\sigma_y = 12$ ksi unloaded
Magnification: 46.2X
Test Case 11
Specimen - 7-51-3

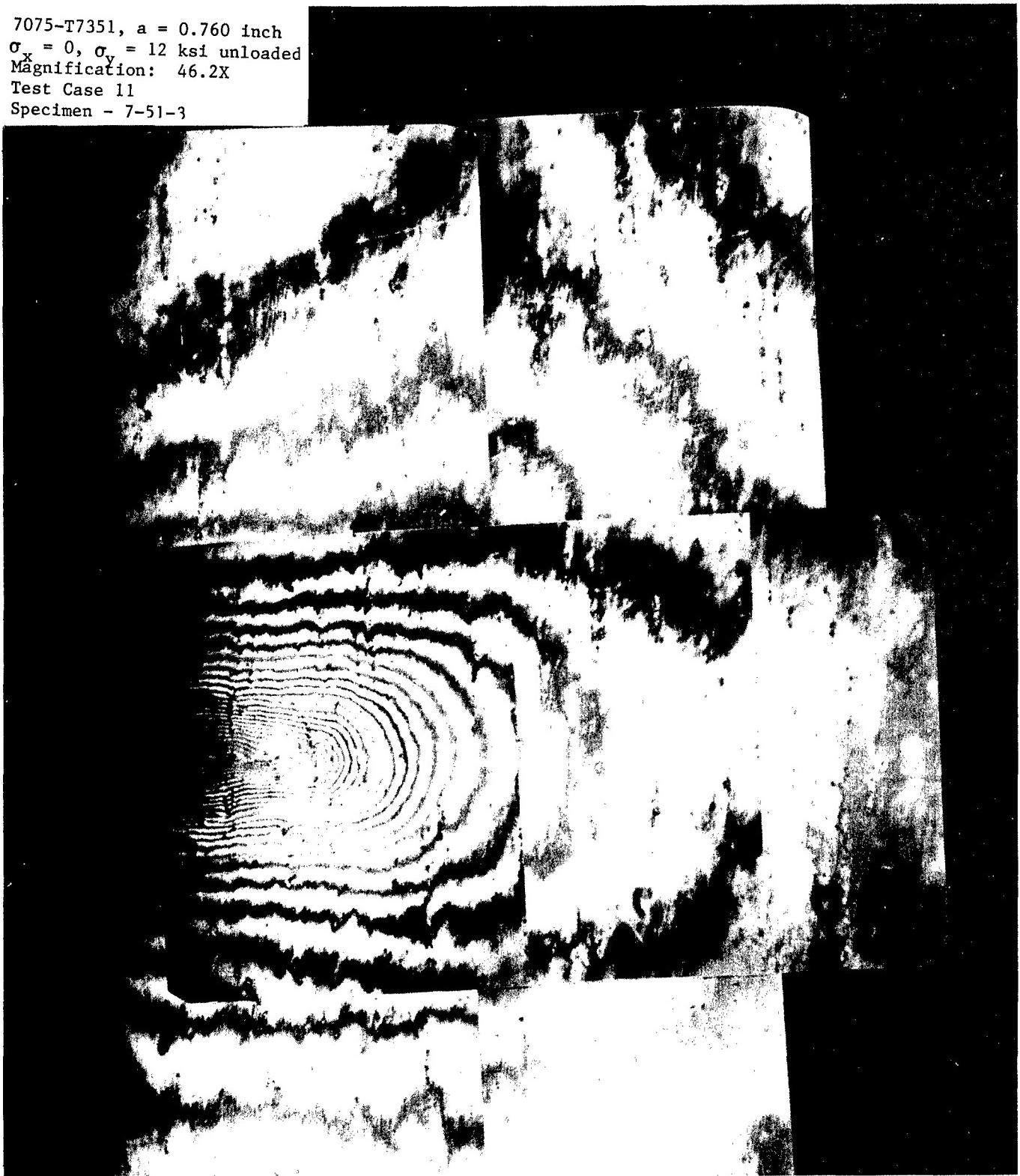


Figure 8. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.760$ inch
 $\sigma_x = 0$, $\sigma_y = 12$ ksi at load
Magnification: 45.1X
Test Case 11
Specimen - 7-51-4

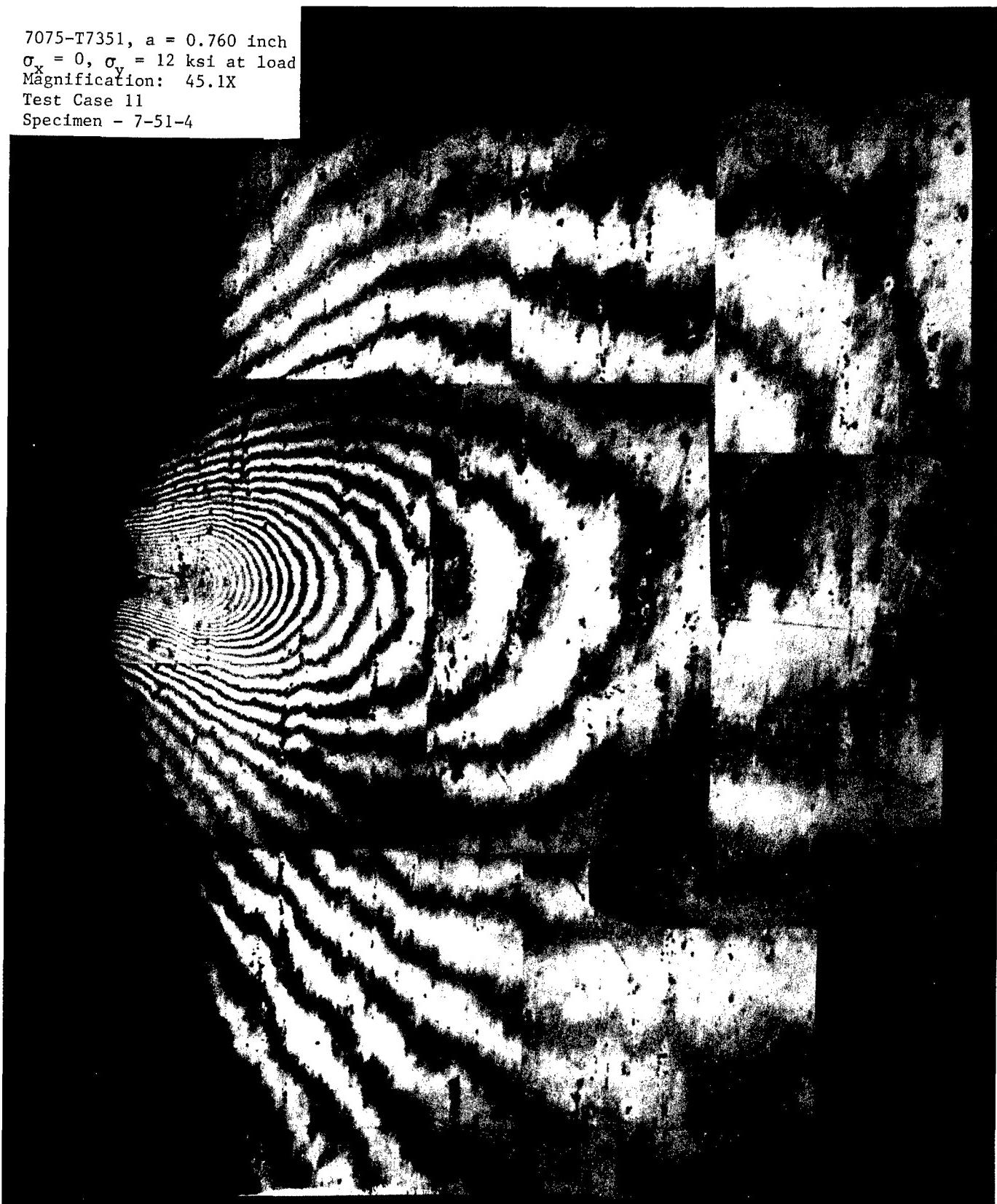


Figure 9. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 1.005$ inch
 $\sigma_x = 0$, $\sigma_y = 12$ ksi unloaded
Magnification: 46.7X
Test Case 11
Specimen - 7-51-5.1



Figure 10. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 1.005$ inch
 $\sigma_x = 0$, $\sigma_y = 12$ ksi unloaded
Magnification: 44.5X
Test Case 11
Specimen 7-51-5.2

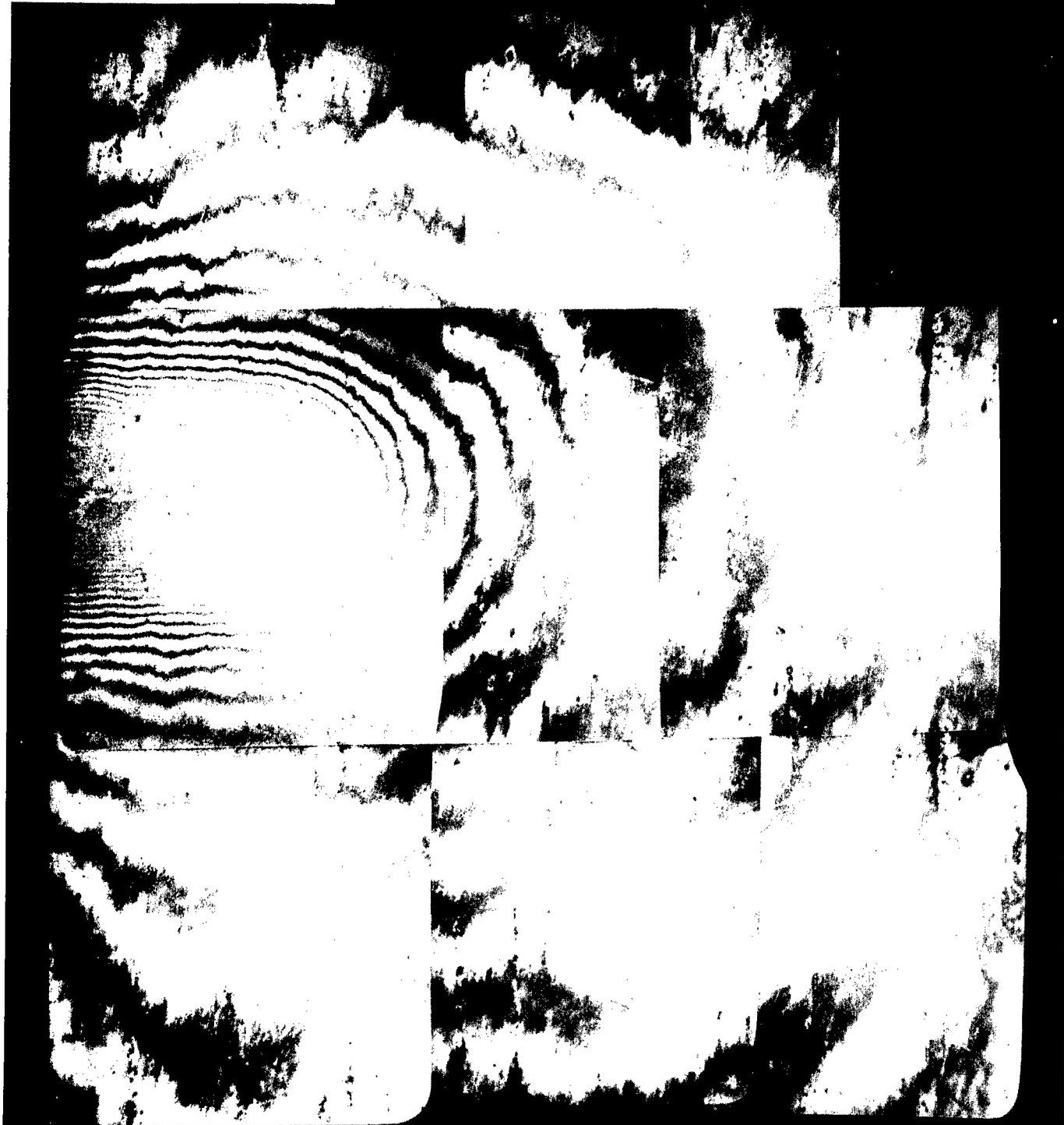


Figure 11. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 1.005$ inch
 $\sigma_x = 0$, $\sigma_y = 12$ ksi at load
Magnification: 46.0X
Test Case 11
Specimen 7-51-6

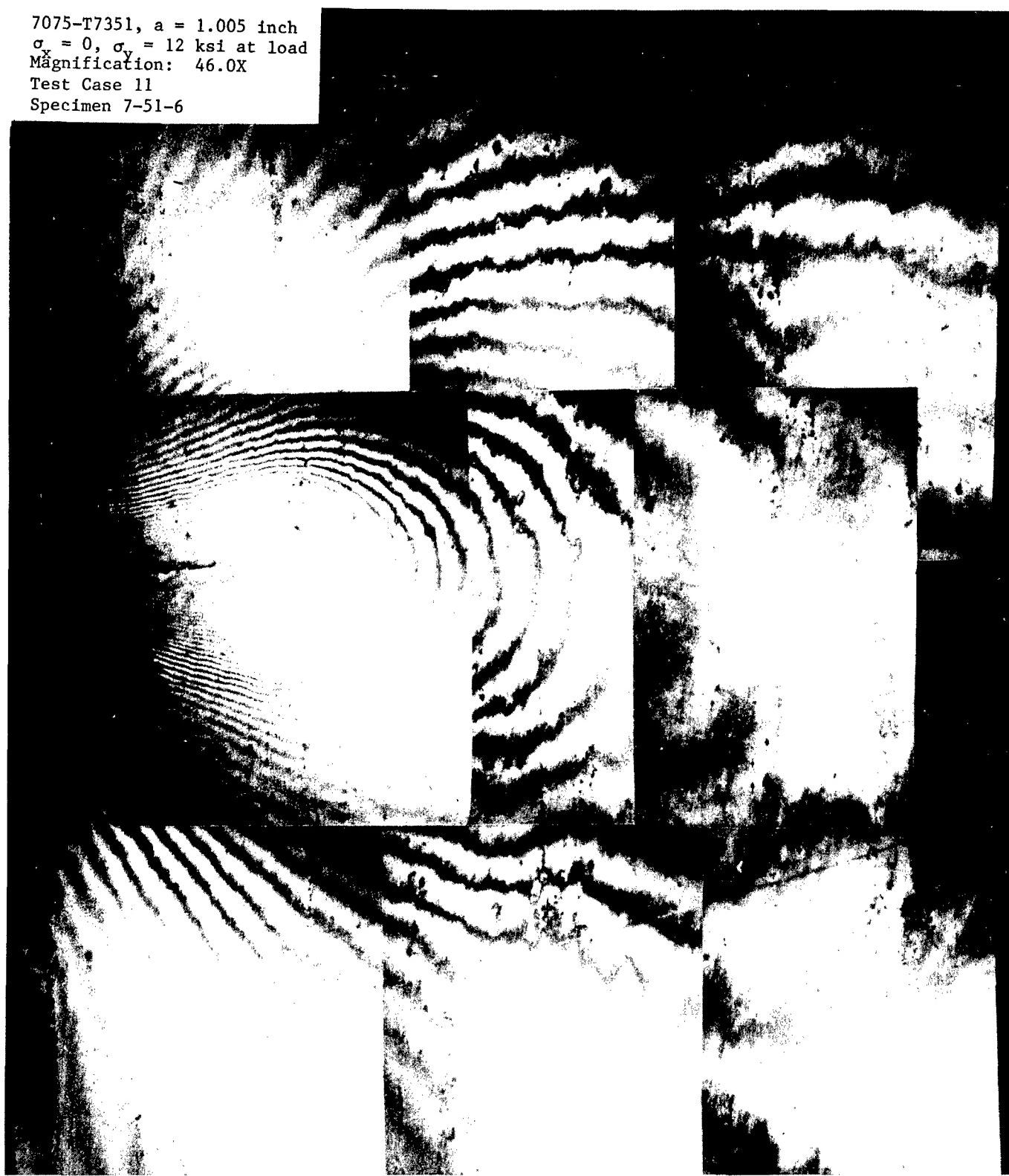


Figure 12. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.25$ inch
 $\sigma_x = 12$, $\sigma_y = 12$ ksi unloaded
Magnification: 48.2X
Test Case 23
Specimen 7-17-1



Figure 13. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.25$ inch
 $\sigma_x = 12$, $\sigma_y = 12$ ksi at load
Magnification: 49.2X
Test Case 23
Specimen 7-17-2



Figure 14. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.5$ inch
 $\sigma_x = 12$, $\sigma_y = 12$ ksi unloaded
Magnification: 51.1X
Test Case 23
Specimen 7-17-3



Figure 15. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.5$ inch
 $\sigma_x = 12$, $\sigma_y = 12$ ksi at load
Magnification: 46.9X
Test Case 23
Specimen 7-17-4

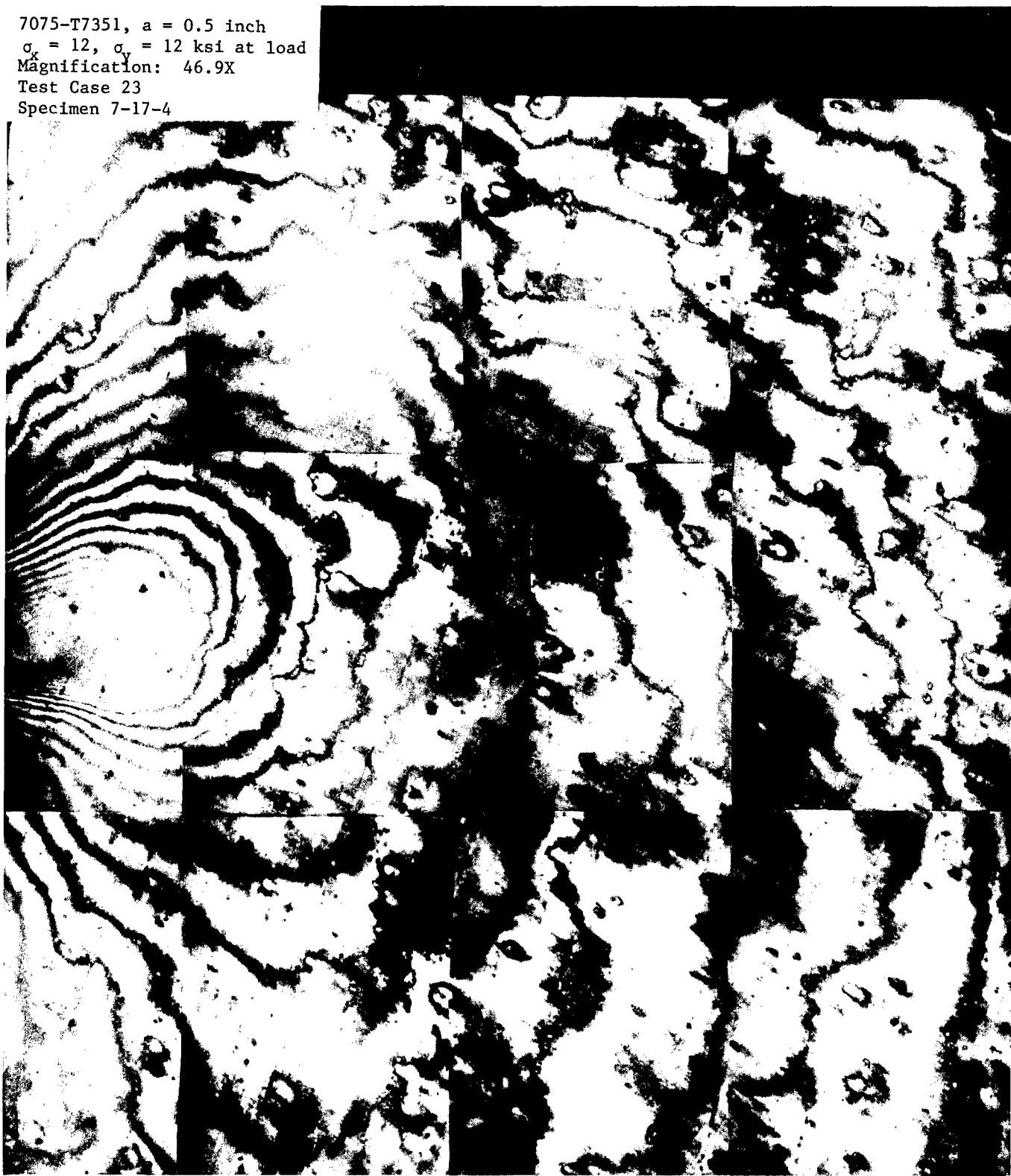


Figure 16. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.995$ inch
 $\sigma_x = 12$, $\sigma_y = 12$ ksi unloaded
Magnification: 47.5X
Test Case 23
Specimen 7-17-5

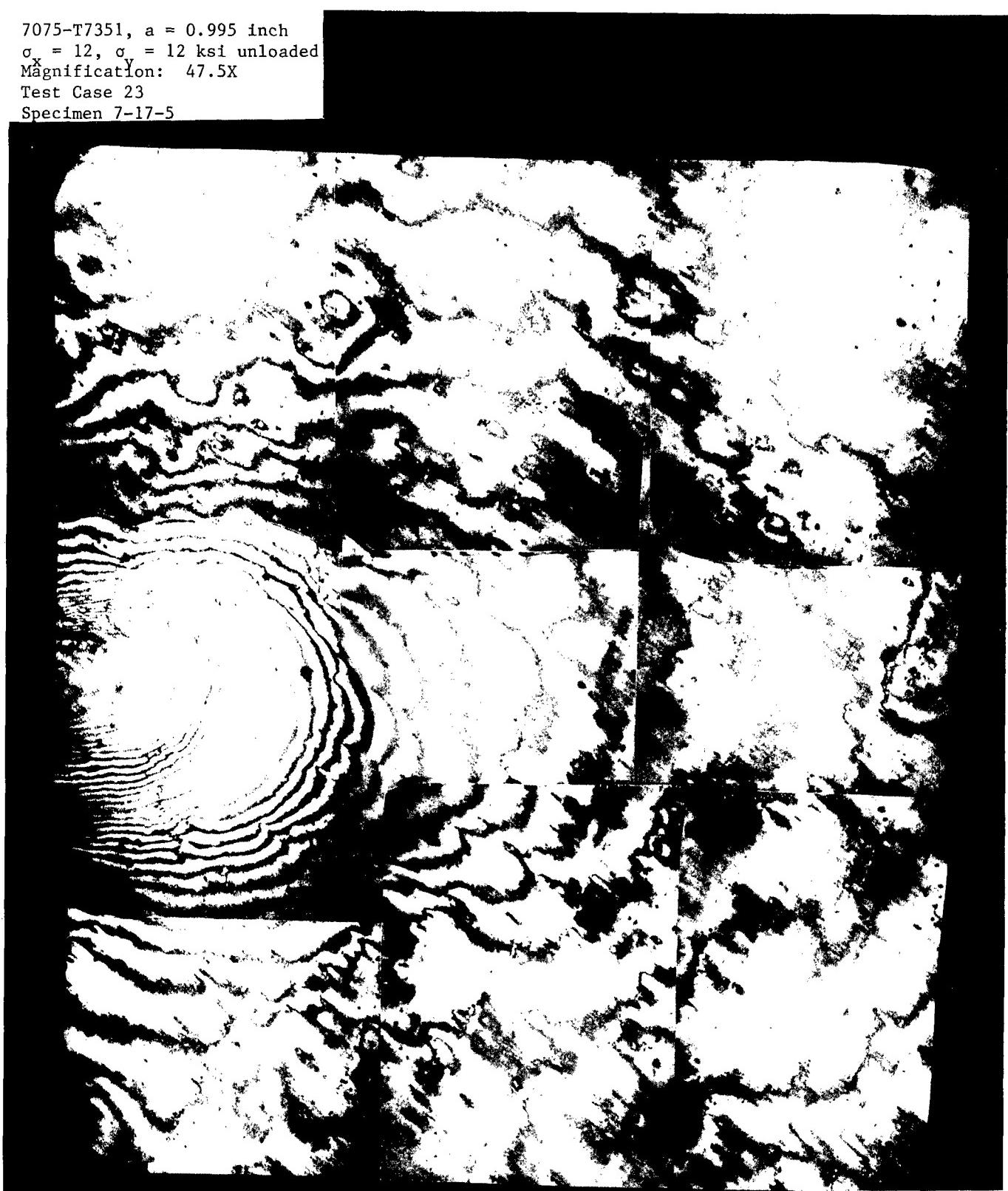


Figure 17. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.995$ inch
 $\sigma_x = 12$, $\sigma_y = 12$ ksi at load
Magnification: 44.8X
Test Case 23
Specimen 7-17-6

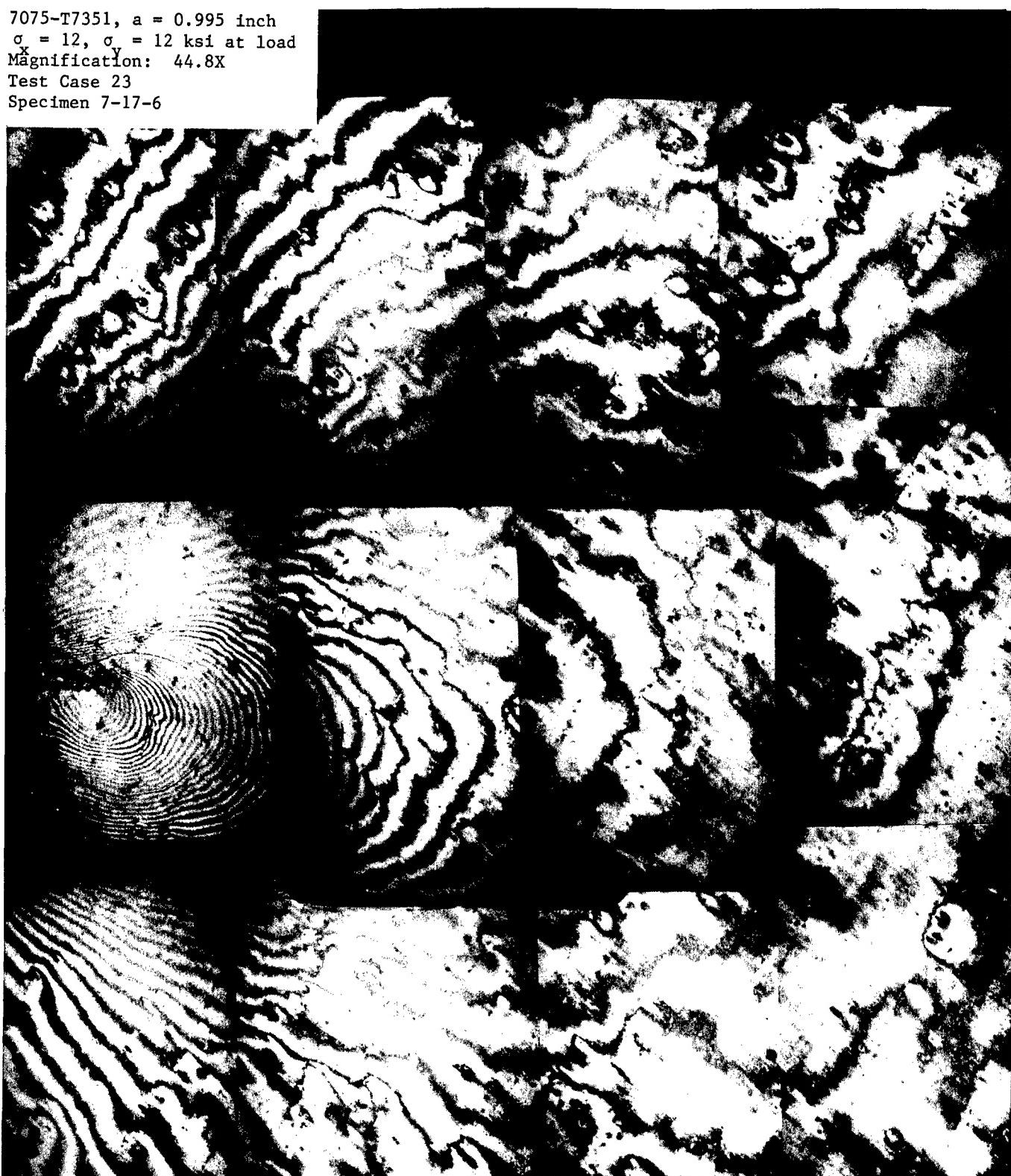


Figure 18. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.26$ inch
 $\sigma_x = -1.2$, $\sigma_y = 12$ ksi unloaded
Magnification: 48.0X
Test Case 25
Specimen 7-23-1

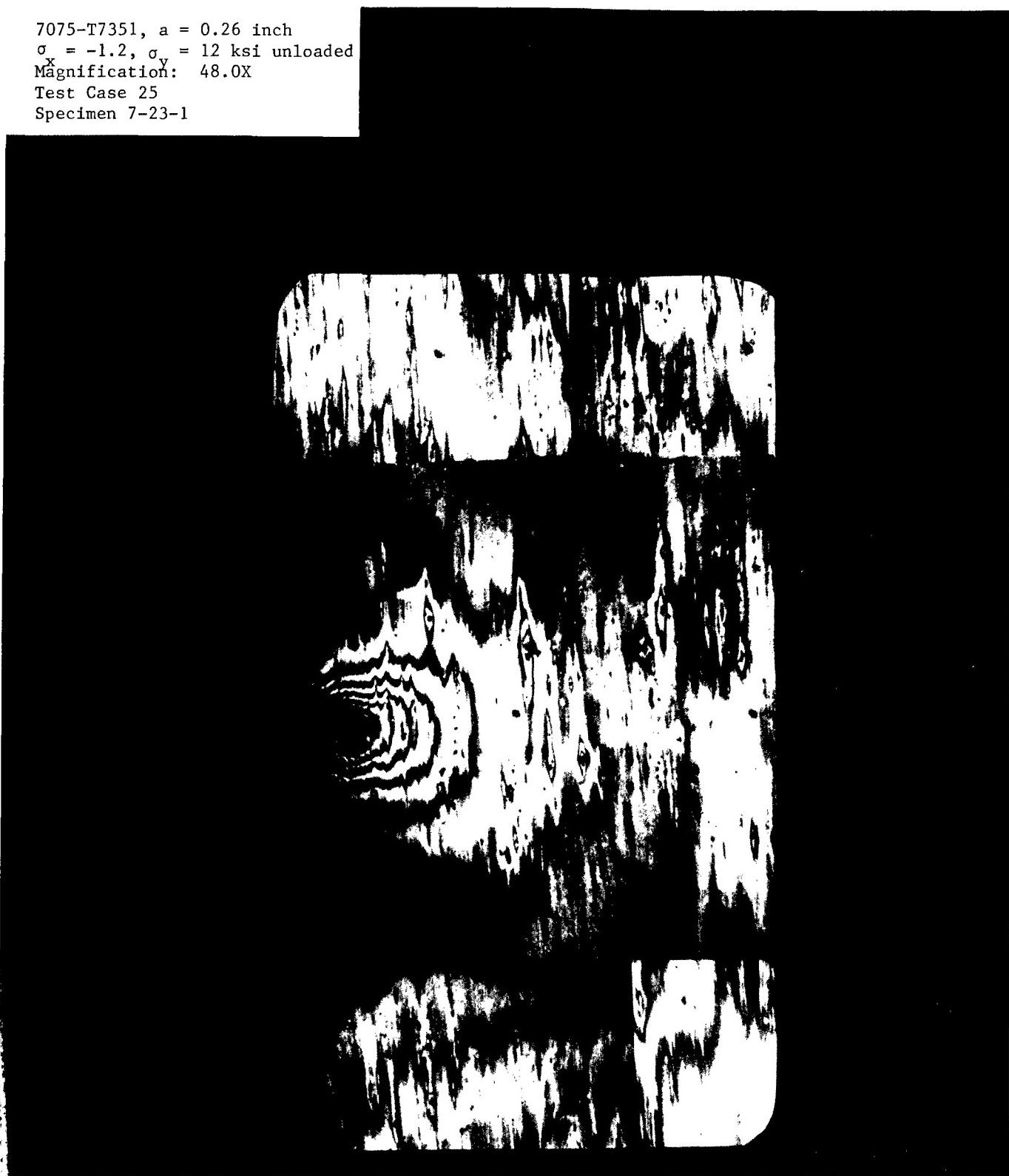


Figure 19. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.26$ inch
 $\sigma_x = -1.2$, $\sigma_y = 12$ ksi at load
Magnification: 47.1X
Test Case 25
Specimen 7-23-2



Figure 20. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.505$ inch
 $\sigma_x = -1.2$, $\sigma_y = 12$ ksi unloaded
Magnification: 47.8X
Test Case 25
Specimen 7-23-3

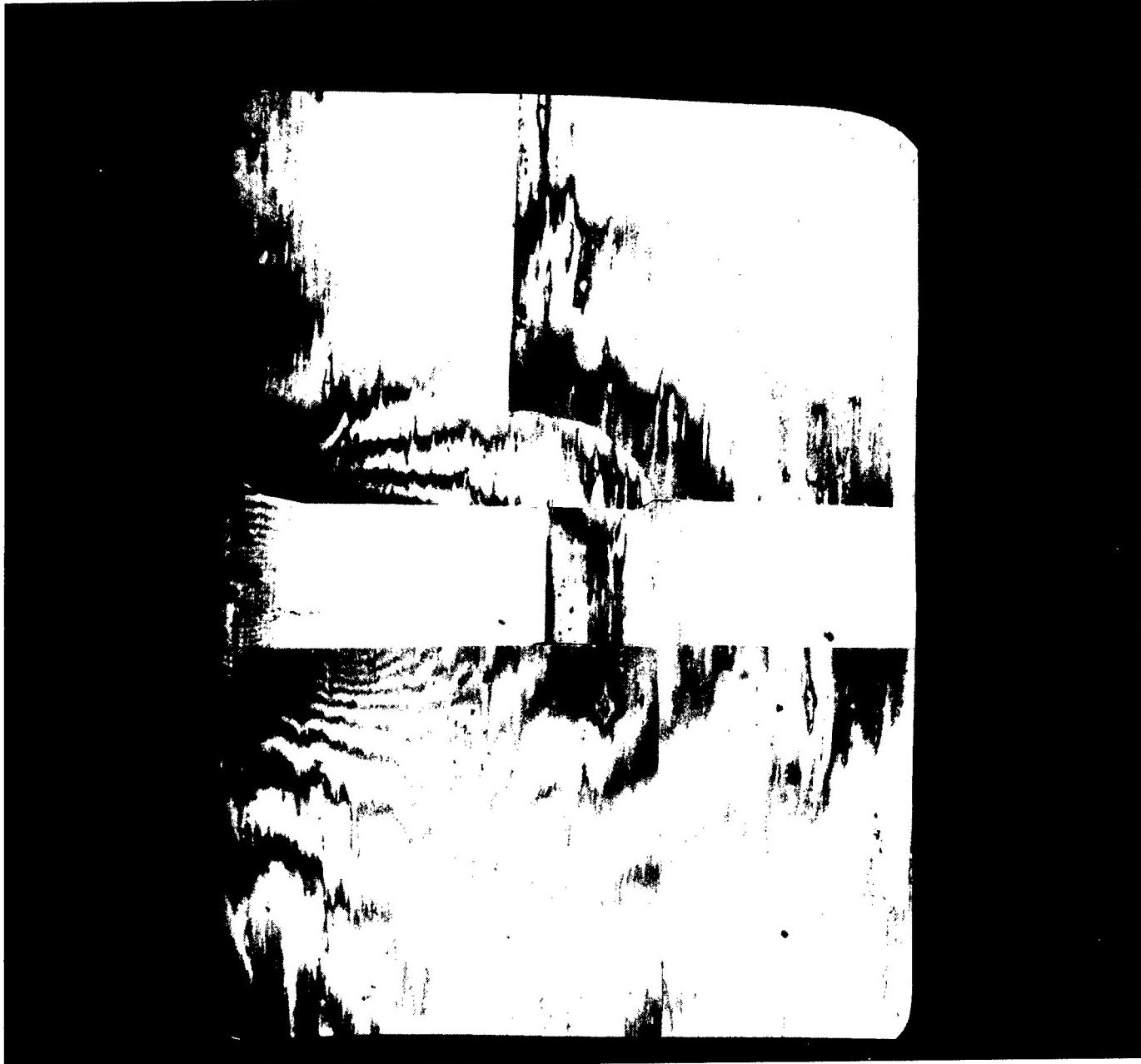


Figure 21. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.505$ inch
 $\sigma_x = -1.2$, $\sigma_y = 12$ ksi at load
Magnification: 39.5X
Test Case 25
Specimen 7-23-4

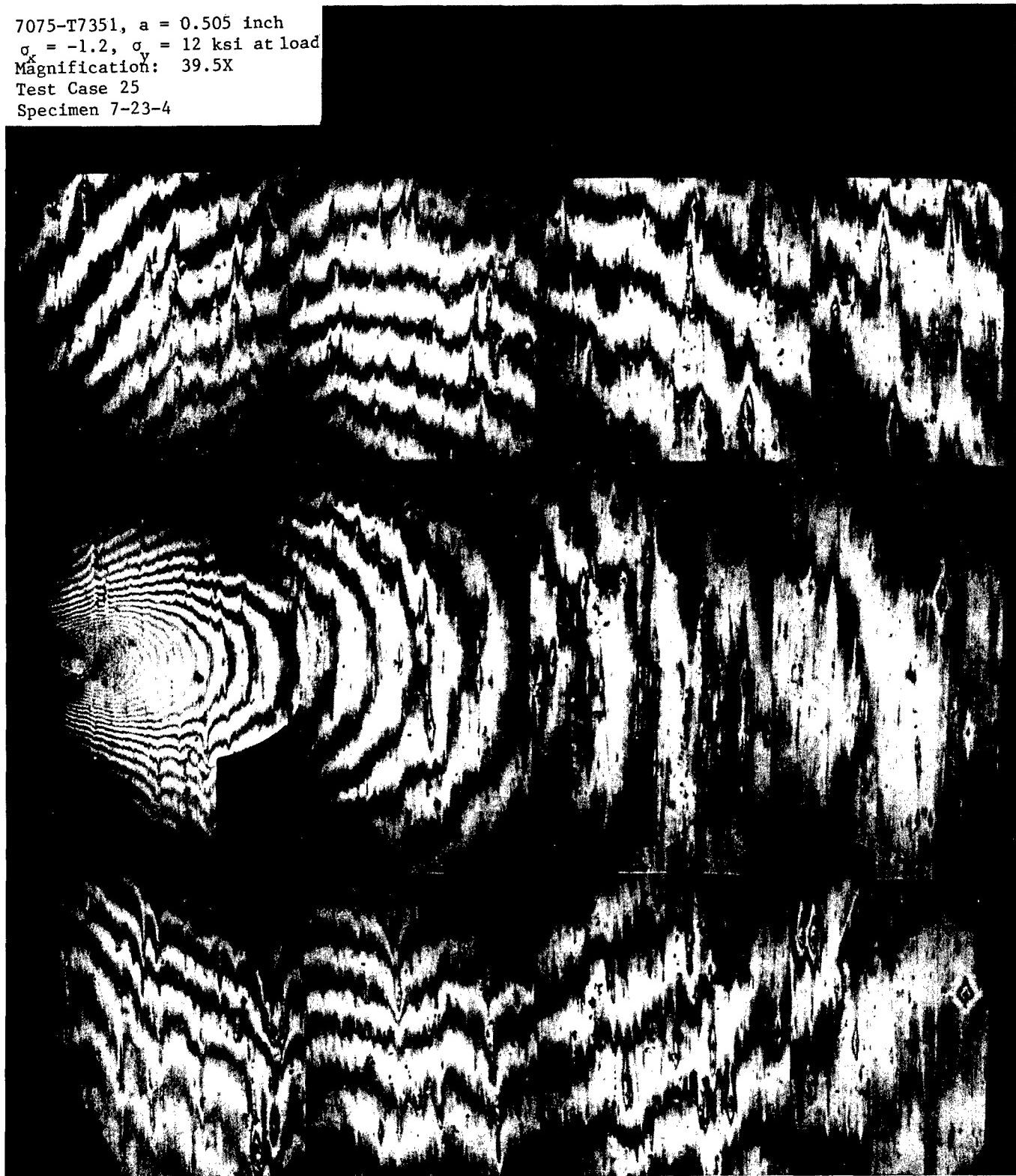


Figure 22. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 1.015$ inch
 $\sigma_x = -1.2$, $\sigma_y = 12$ ksi unloaded
Magnification: 47.6X
Test Case 25
Specimen 7-23-5



Figure 23. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 1.015$ inch
 $\sigma_x = -1.2$, $\sigma_y = 12$ ksi at load
Magnification: 38.0X
Test Case 25
Specimen 7-23-6

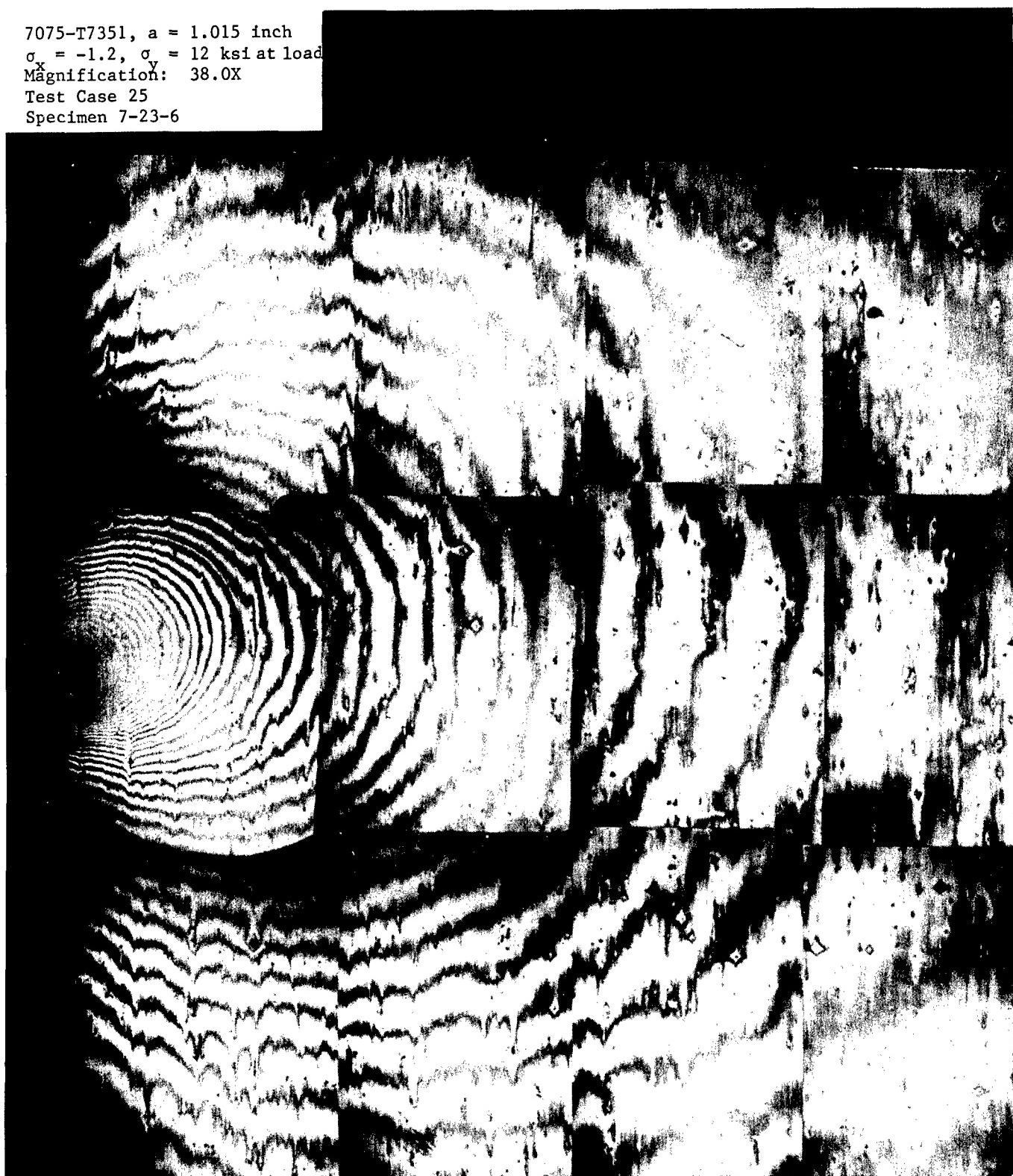


Figure 24. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.25$ inch
 $\sigma_x = 6$, $\sigma_y = 12$ ksi unloaded
Magnification: 49.4X
Test Case 27
Specimen 7-94-1

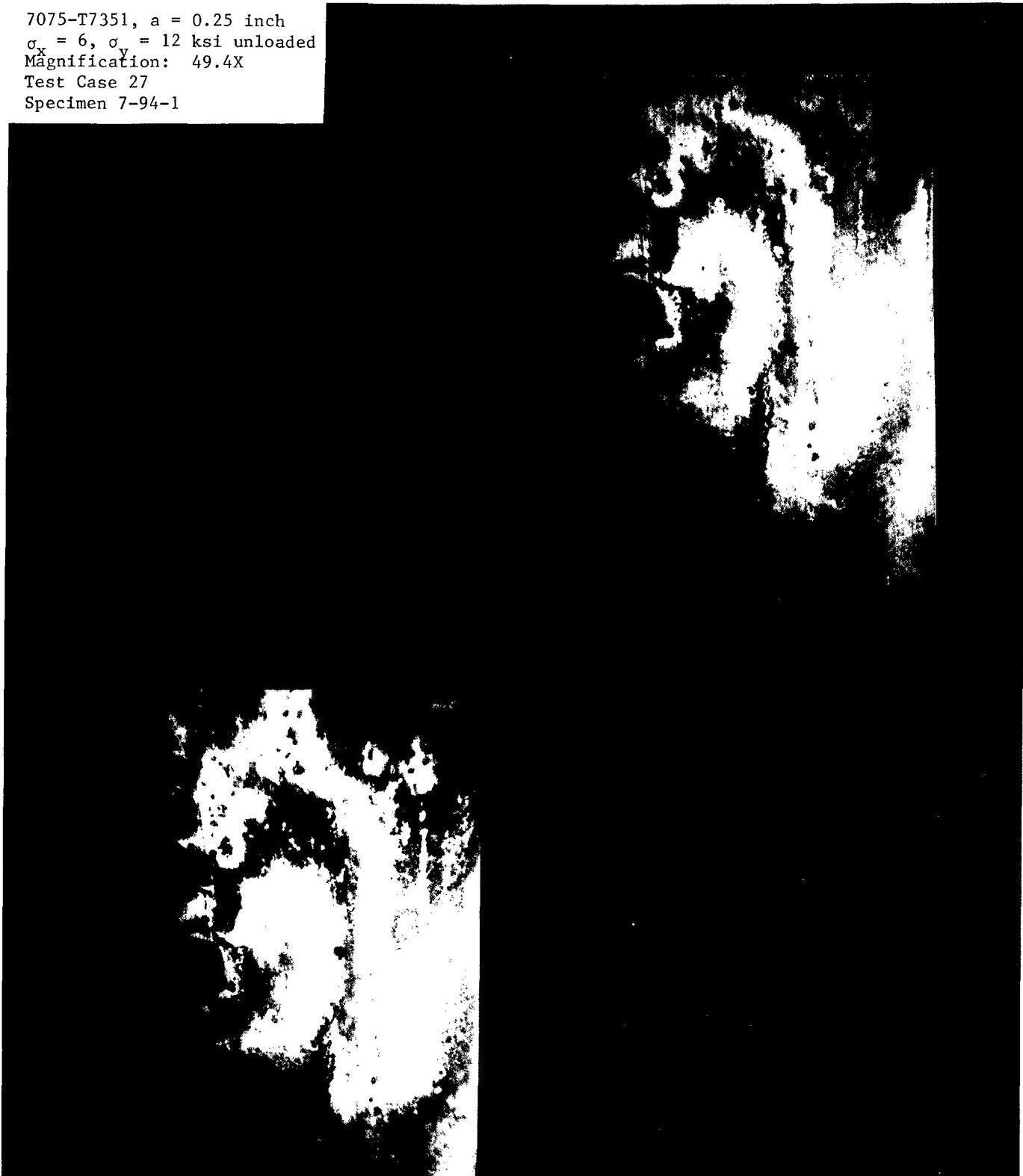


Figure 25. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.25$ inch
 $\sigma_x = 6$, $\sigma_y = 12$ ksi at load
Magnification: 46.2X
Test Case 27
Specimen 7-94-2



Figure 26. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.495$ inch
 $\sigma_x = 6$, $\sigma_y = 12$ ksi unloaded
Magnification: 45.0X
Test Case 27
Specimen 7-94-3

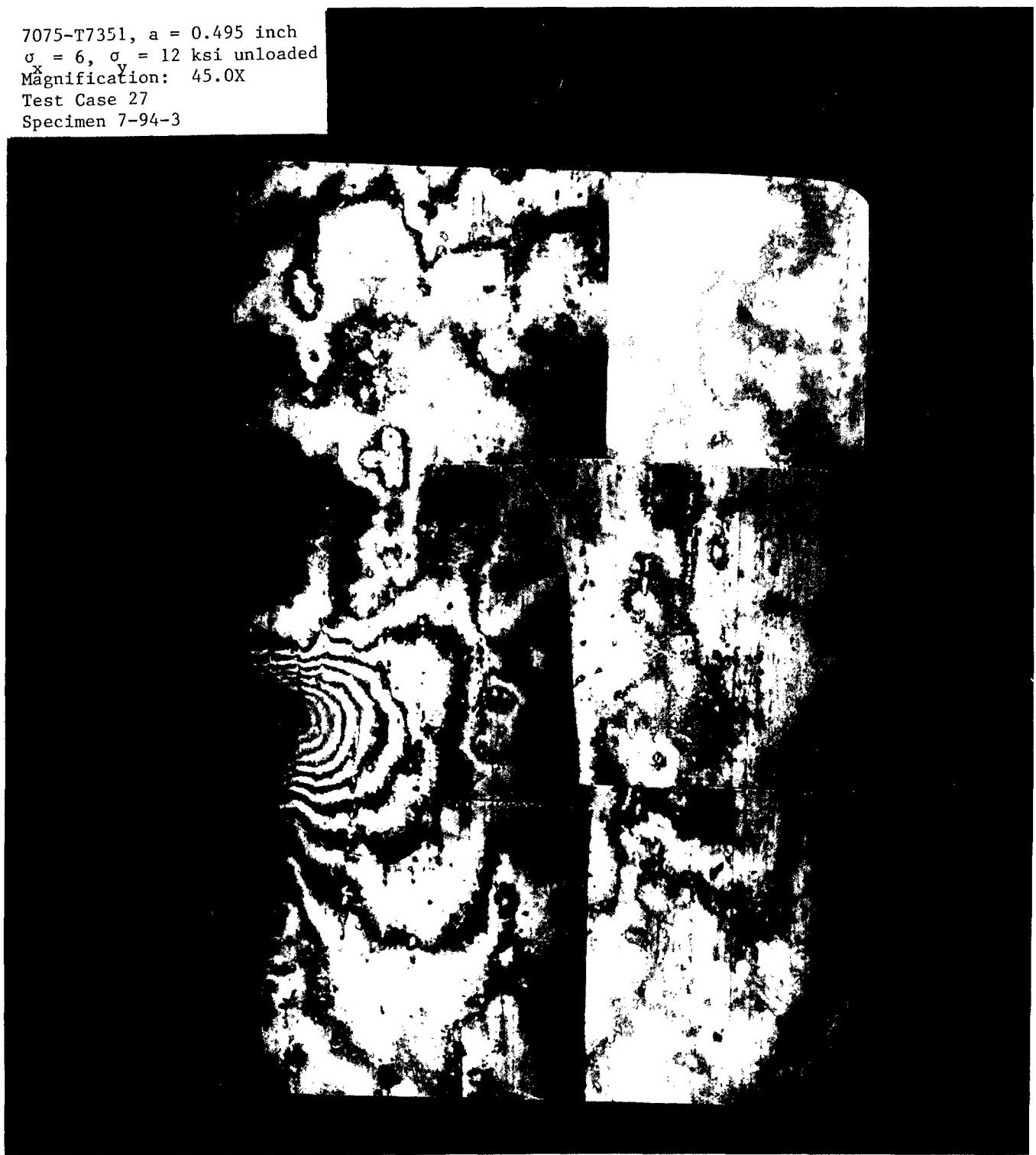


Figure 27. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.495$ inch
 $\sigma_x = 6$, $\sigma_y = 12$ ksi at load
Magnification: 45.4X
Test Case 27
Specimen 7-94-4

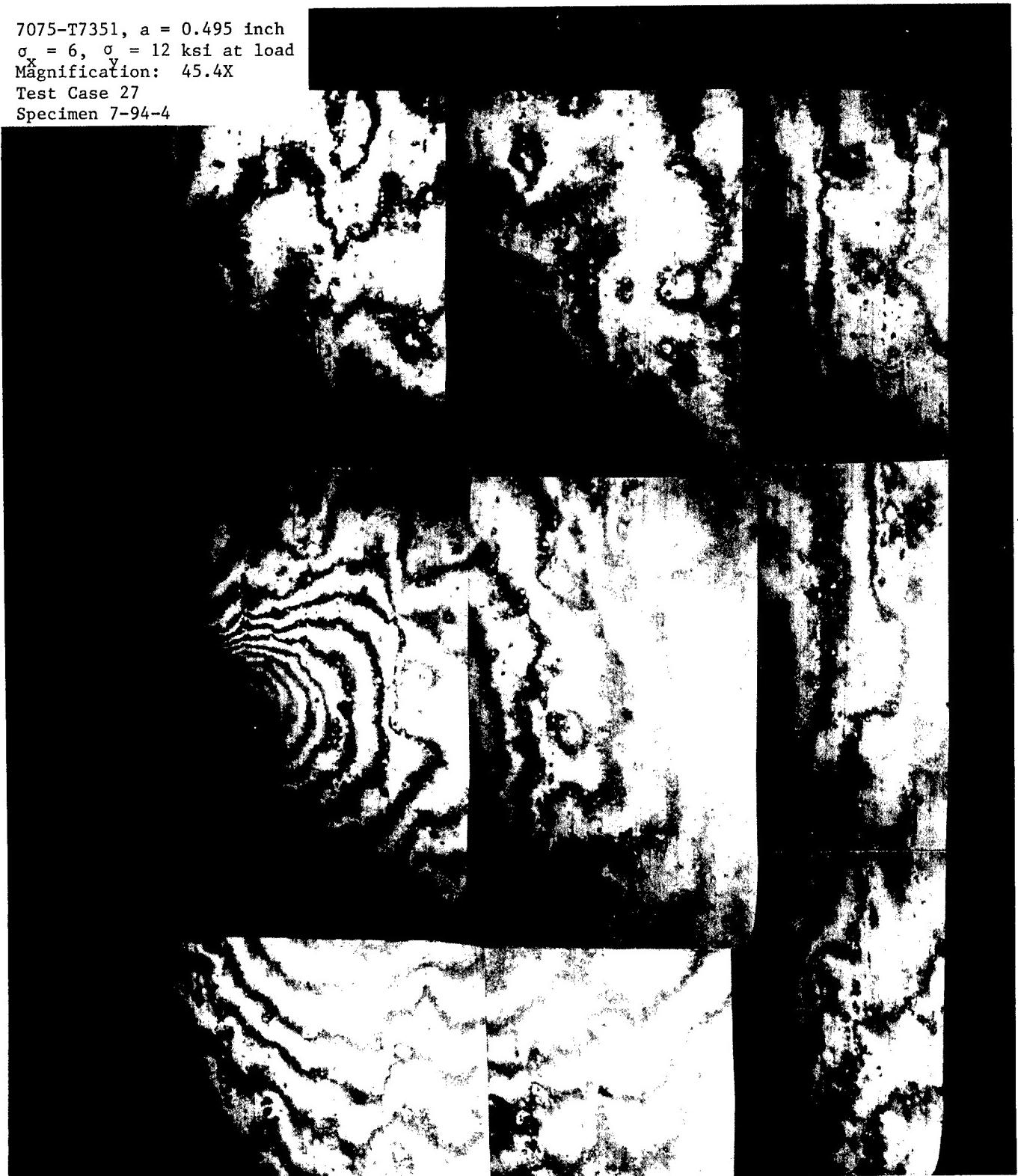


Figure 28. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 1.00$ inch
 $\sigma_x = 6$, $\sigma_y = 12$ ksi unloaded
Magnification: 45.0X
Test Case 27
Specimen 7-94-5



Figure 29. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 1.00$ inch
 $\sigma_x = 6$, $\sigma_y = 12$ ksi at load
Magnification: 45.0X
Test Case 27
Specimen 7-94-6.1

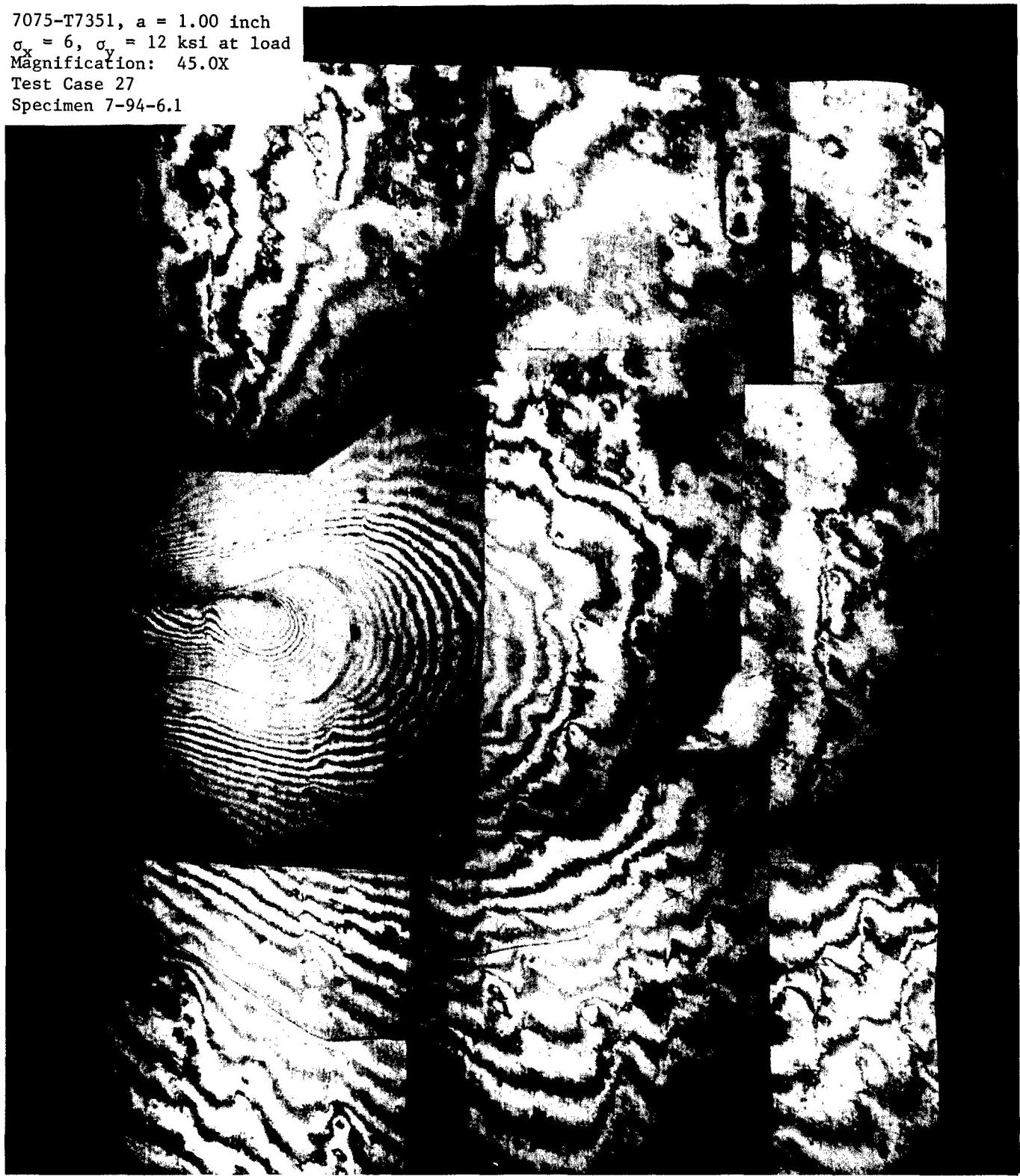


Figure 30. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 1.00$ inch
 $\sigma_x = 6$, $\sigma_y = 12$ ksi at load
Magnification: 45.0X
Test Case 27
Specimen 7-94-6.2

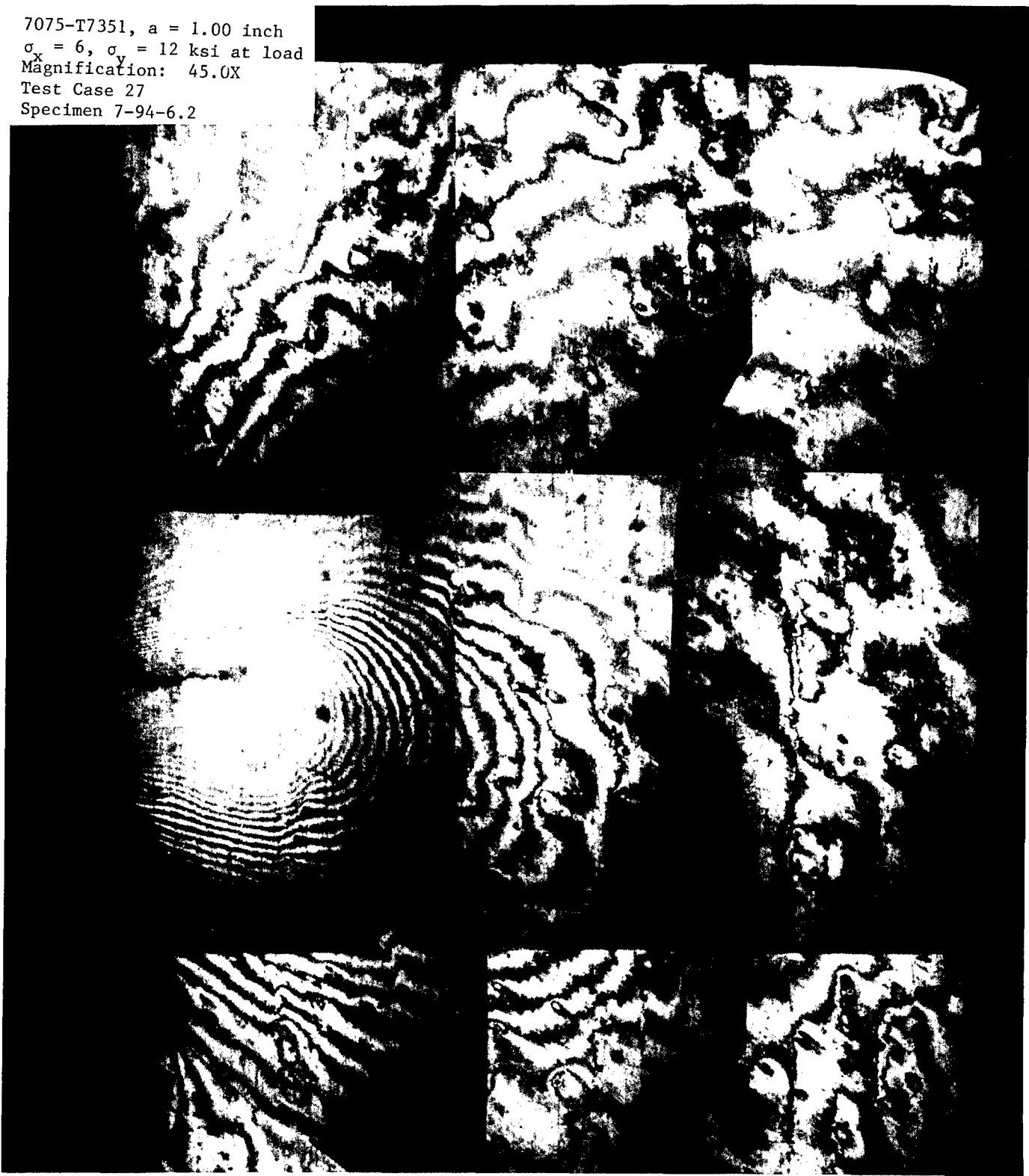


Figure 31. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.215$ inch
 $\sigma_x = 18$, $\sigma_y = 18$ ksi unloaded
Magnification: 45.5X
Test Case 55
Specimen 7-11-1



Figure 32. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.215$ inch
 $\sigma_x = 18$, $\sigma_y = 18$ ksi at load
Magnification: 41.3X
Test Case 55
Specimen 7-11-2

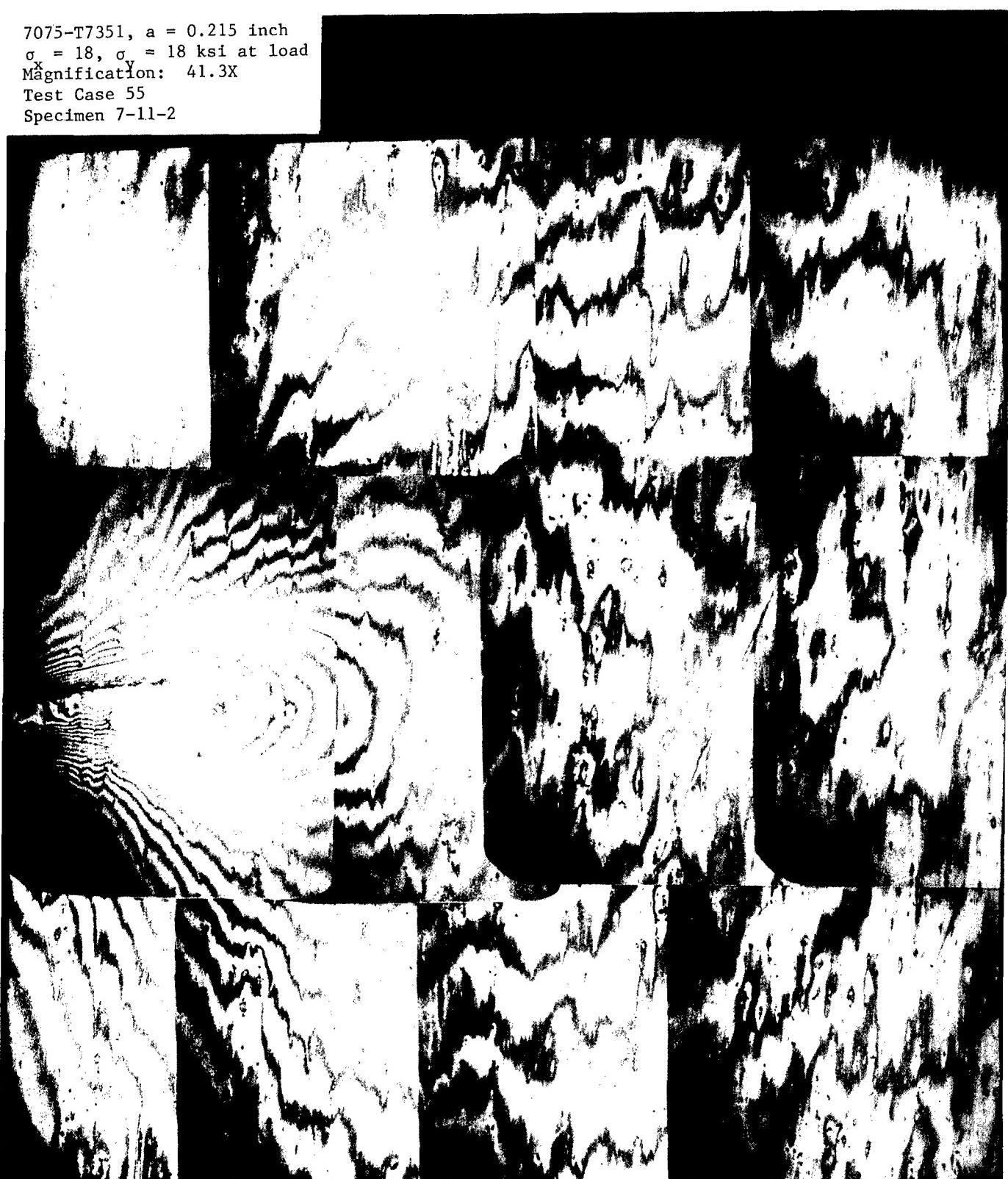


Figure 33. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.43$ inch
 $\sigma_x = 18$, $\sigma_y = 18$ ksi unloaded
Magnification: 47.9X
Test Case 55
Specimen 7-11-3

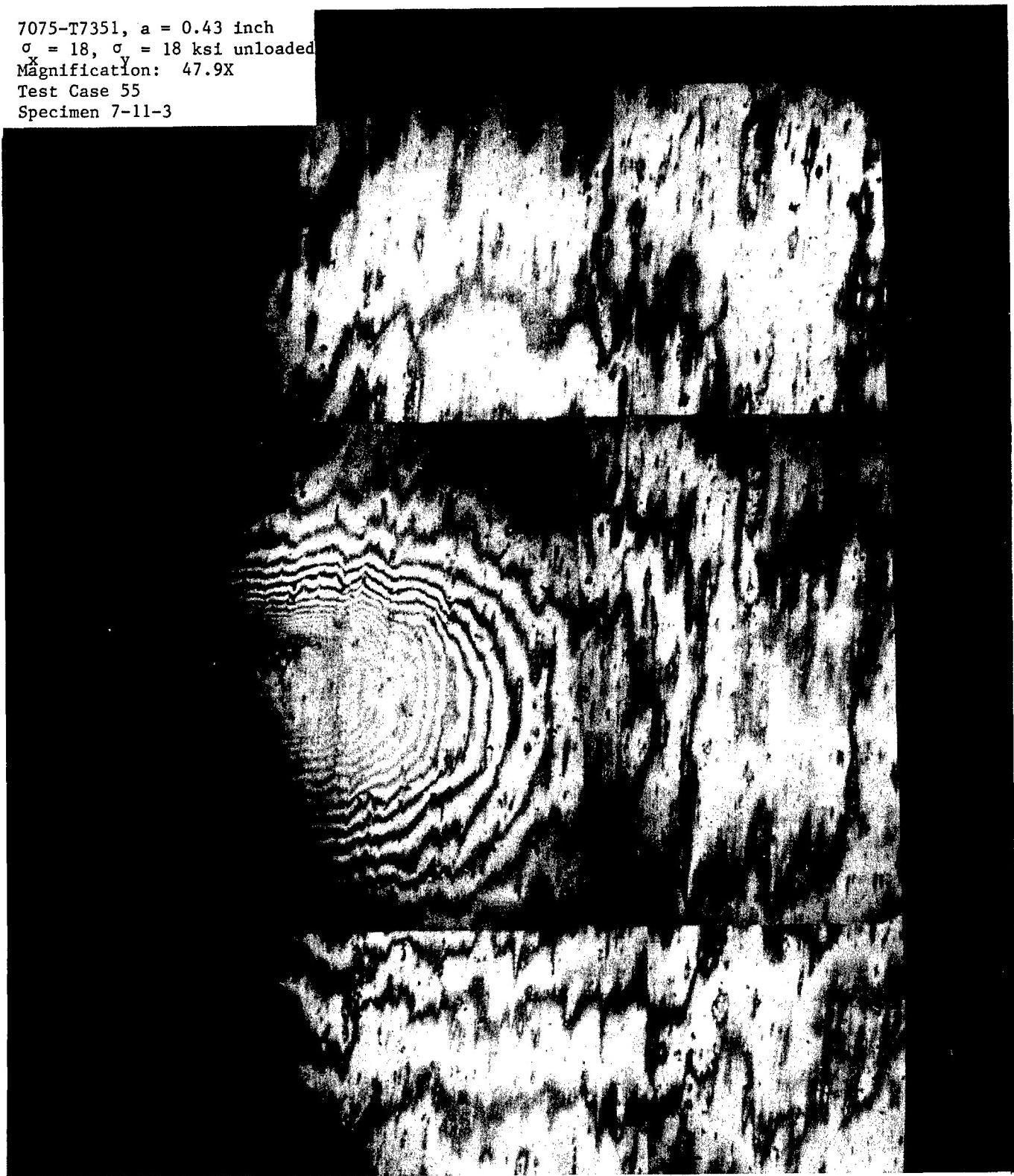


Figure 34. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.43$ inch
 $\sigma_x = 18$, $\sigma_y = 18$ ksi at load
Magnification: 43.8X
Test Case 55
Specimen 7-11-4

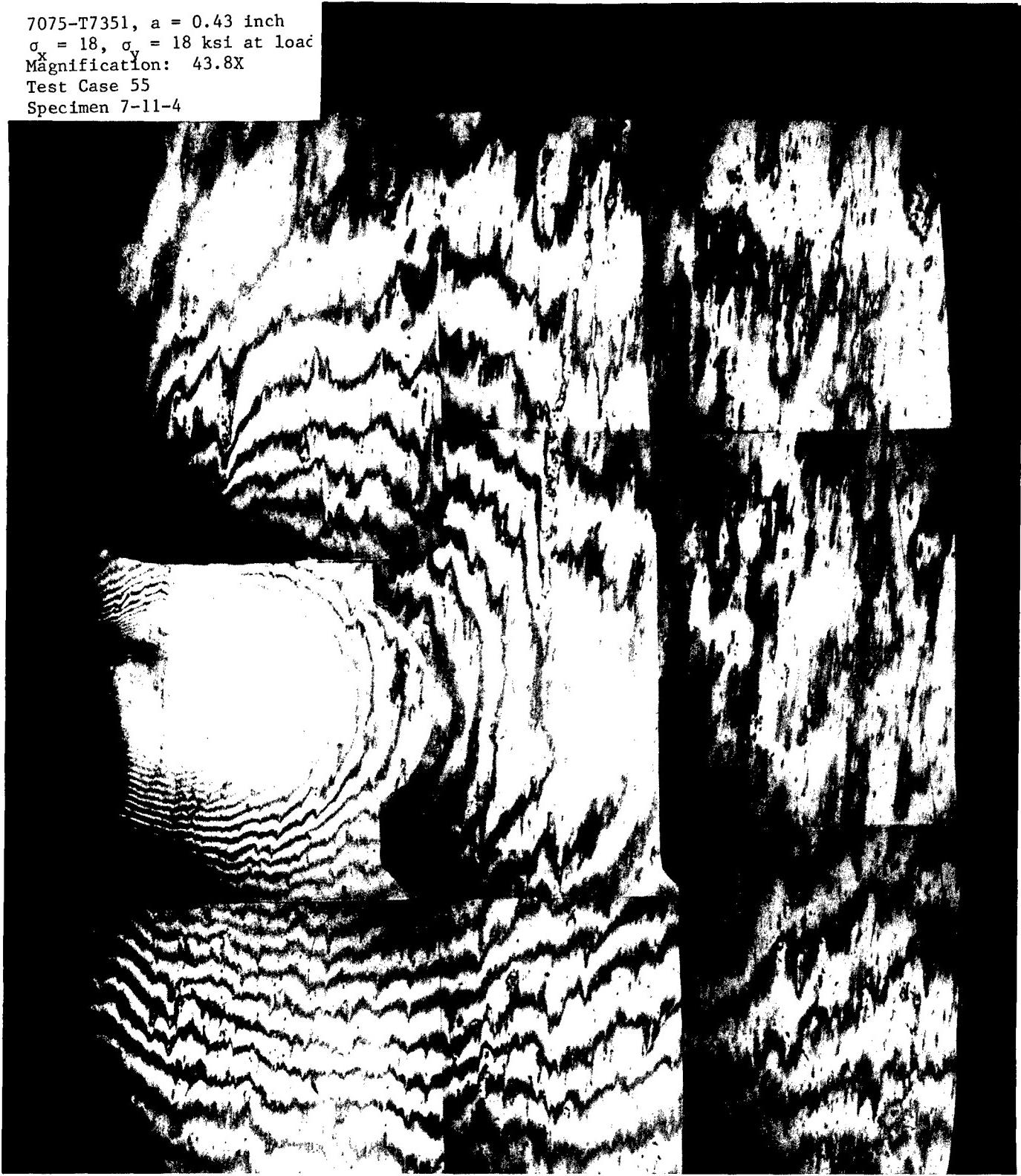


Figure 35. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.655$ inch
 $\sigma_x = 18$, $\sigma_y = 18$ ksi unloaded
Magnification: 44.5X
Test Case 55
Specimen 7-11-5



Figure 36. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.105$ inch
 $\sigma_x = -1.8$, $\sigma_y = 18$ ksi unloaded
Magnification: 48.6X
Test Case 56
Specimen 7-34-1



Figure 37. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.105$ inch
 $\sigma_x = -1.8$, $\sigma_y = 18$ ksi at load
Magnification: 47.5X
Test Case 56
Specimen 7-34-2

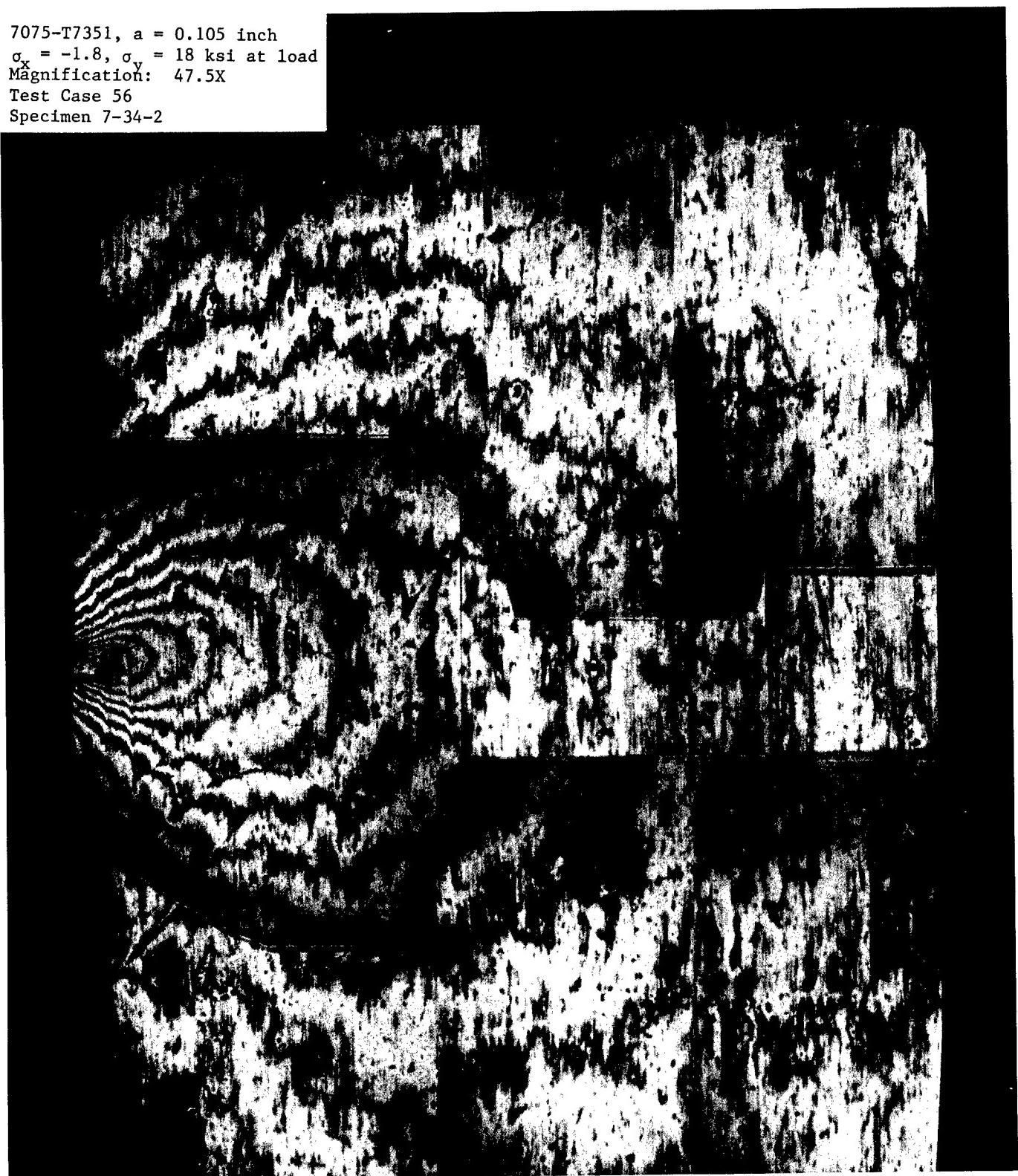


Figure 38. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.215$ inch
 $\sigma_x = -1.8$, $\sigma_y = 18$ ksi unloaded
Magnification: 48.3X
Test Case 56
Specimen 7-34-3.1



Figure 39. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.215$ inch
 $\sigma_x = -1.8$, $\sigma_y = 18$ ksi unloaded
Magnification: 48.3X
Test Case 56
Specimen 7-34-3.2



Figure 40. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.215$ inch
 $\sigma_x = -1.8$, $\sigma_y = 18$ ksi at load
Magnification: 47.6X
Test Case 56
Specimen 7-34-4

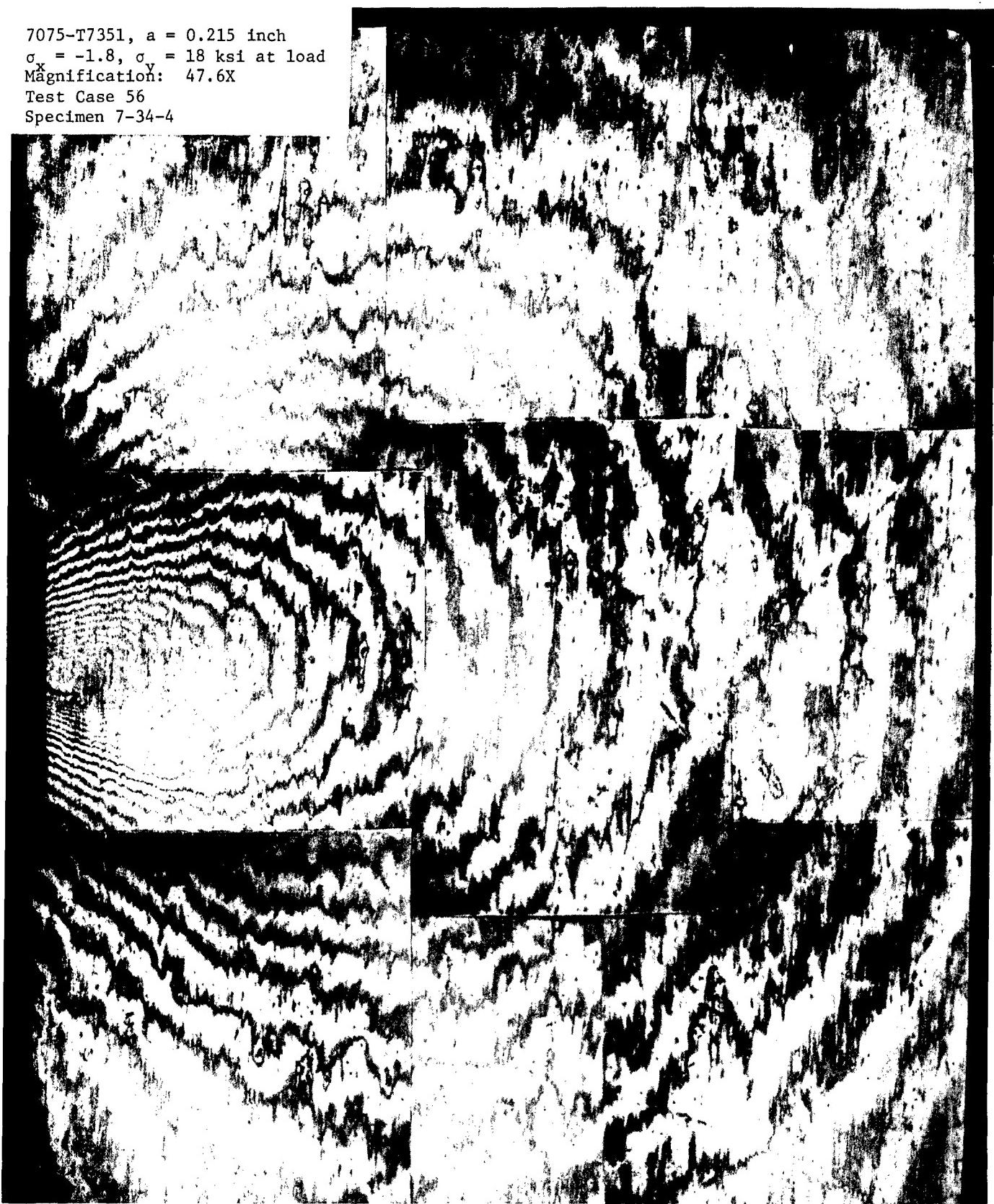


Figure 41. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.43$ inch
 $\sigma_x = -1.8$, $\sigma_y = 18$ ksi unloaded
Magnification: 47.9X
Test Case 56
Specimen 7-34-5

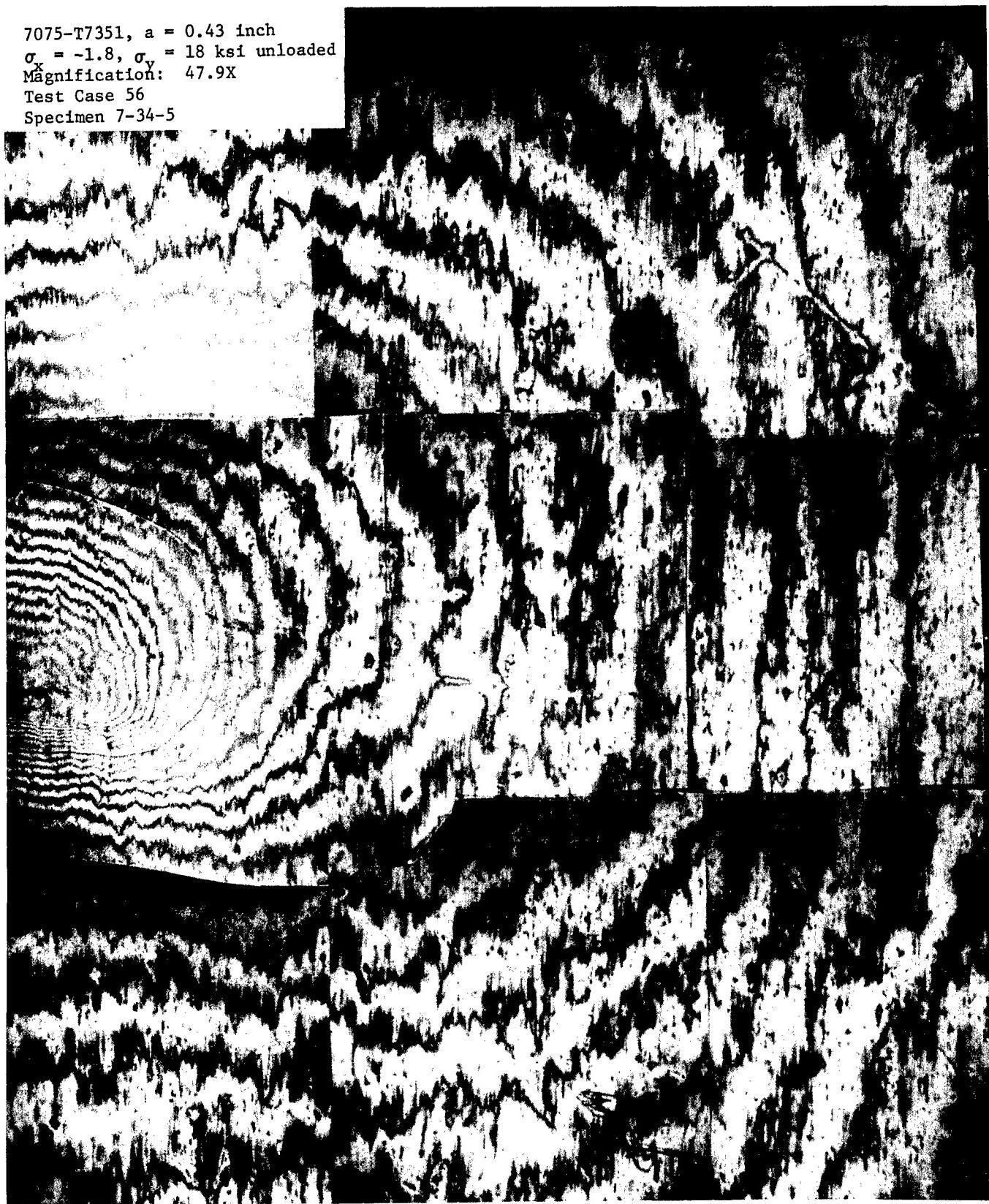


Figure 42. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.43$ inch
 $\sigma_x = -1.8$, $\sigma_y = 18$ ksi at load
Magnification: 37.4X
Test Case 56
Specimen 7-34-6

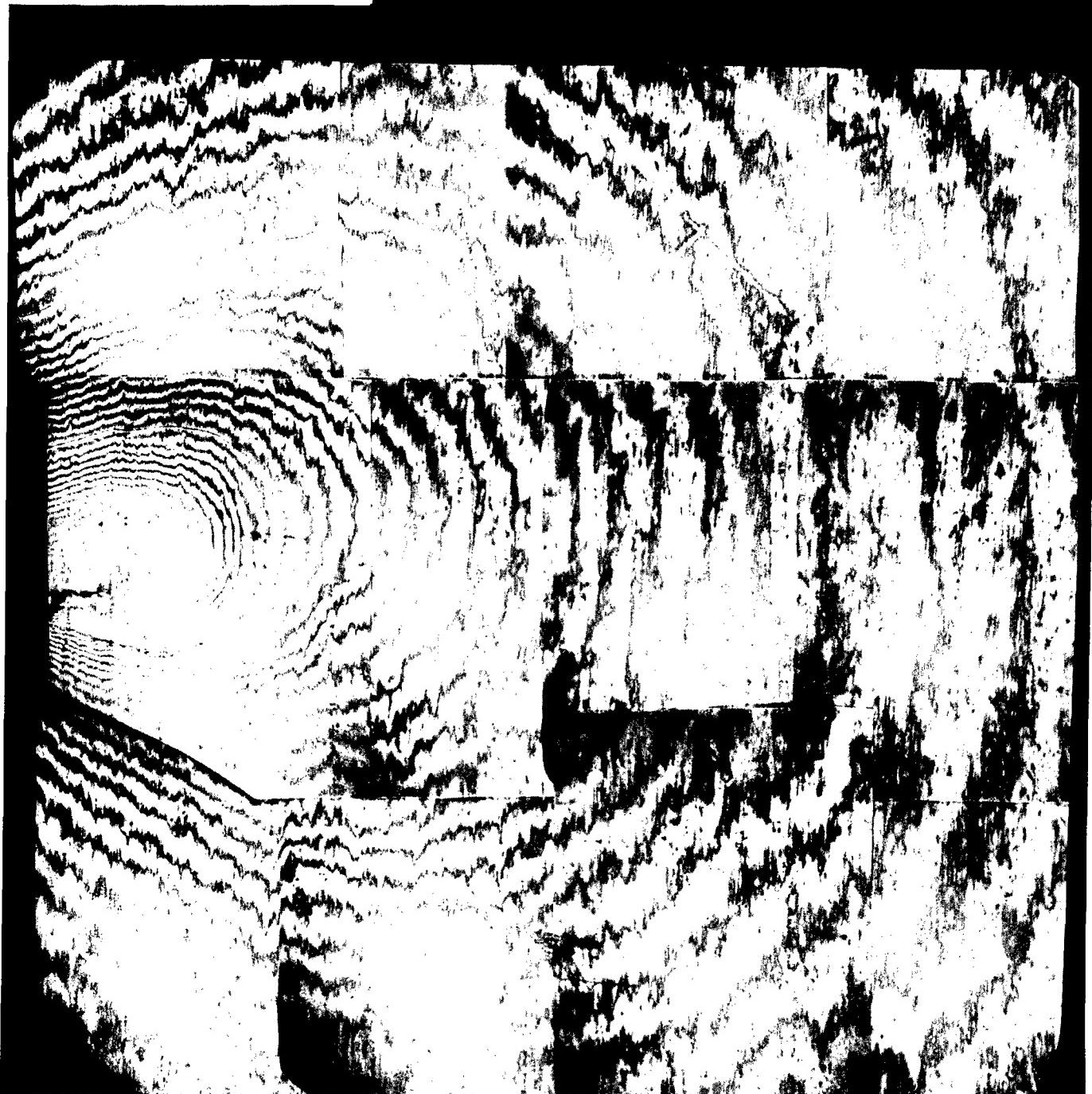


Figure 43. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.14$ inch
 $\sigma_x = 15$, $\sigma_y = 30$ ksi unloaded
Magnification: 45.9X
Test Case 63
Specimen 7-16-1

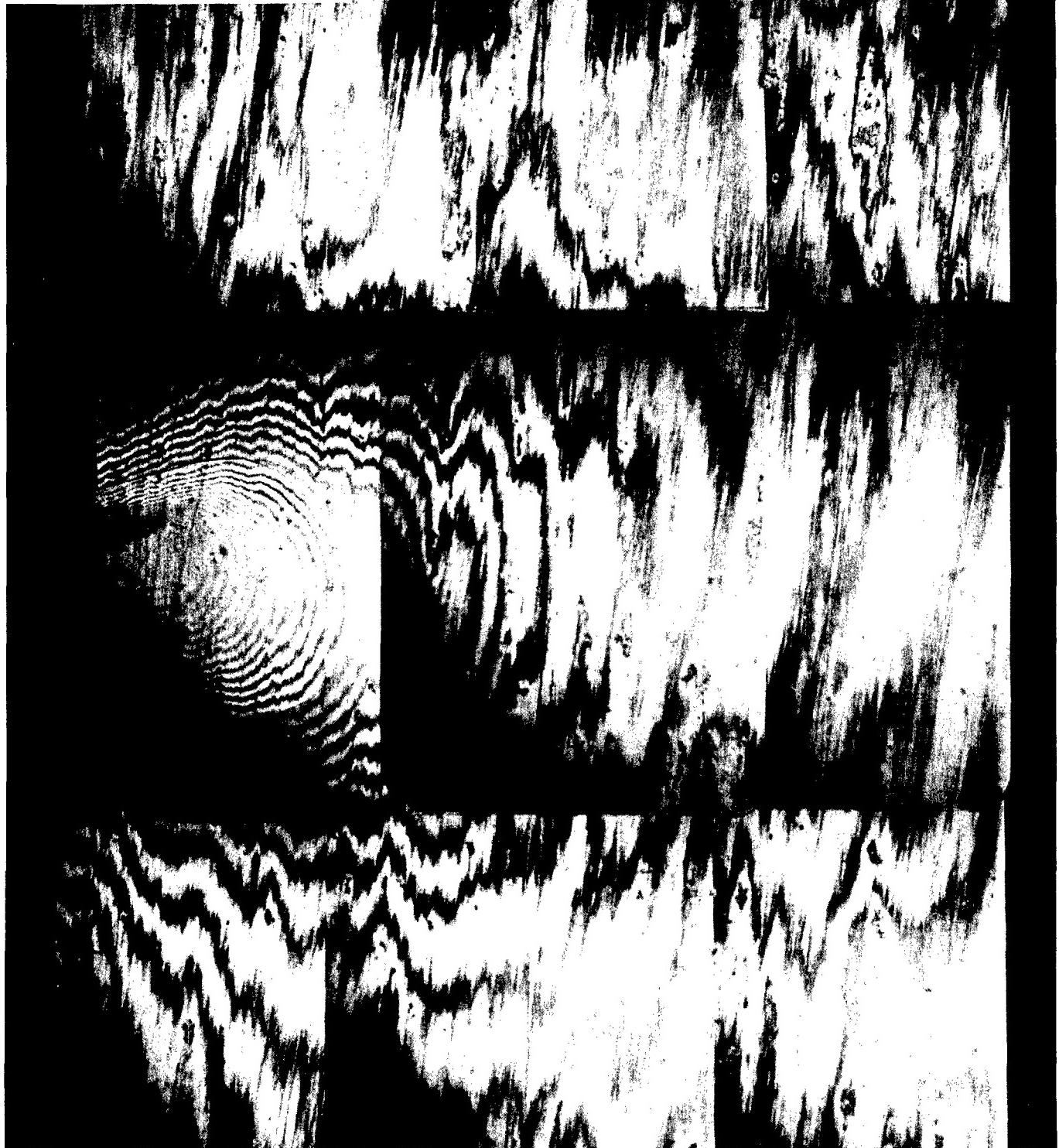


Figure 44. Interferometry Photograph of an Unloaded Crack in a
7075-T7351 Specimen

7075-T7351, $a = 0.14$ inch
 $\sigma_x = 15$, $\sigma_y = 30$ ksi at load
Magnification: 58.3X
Test Case 63
Specimen 7-16-2

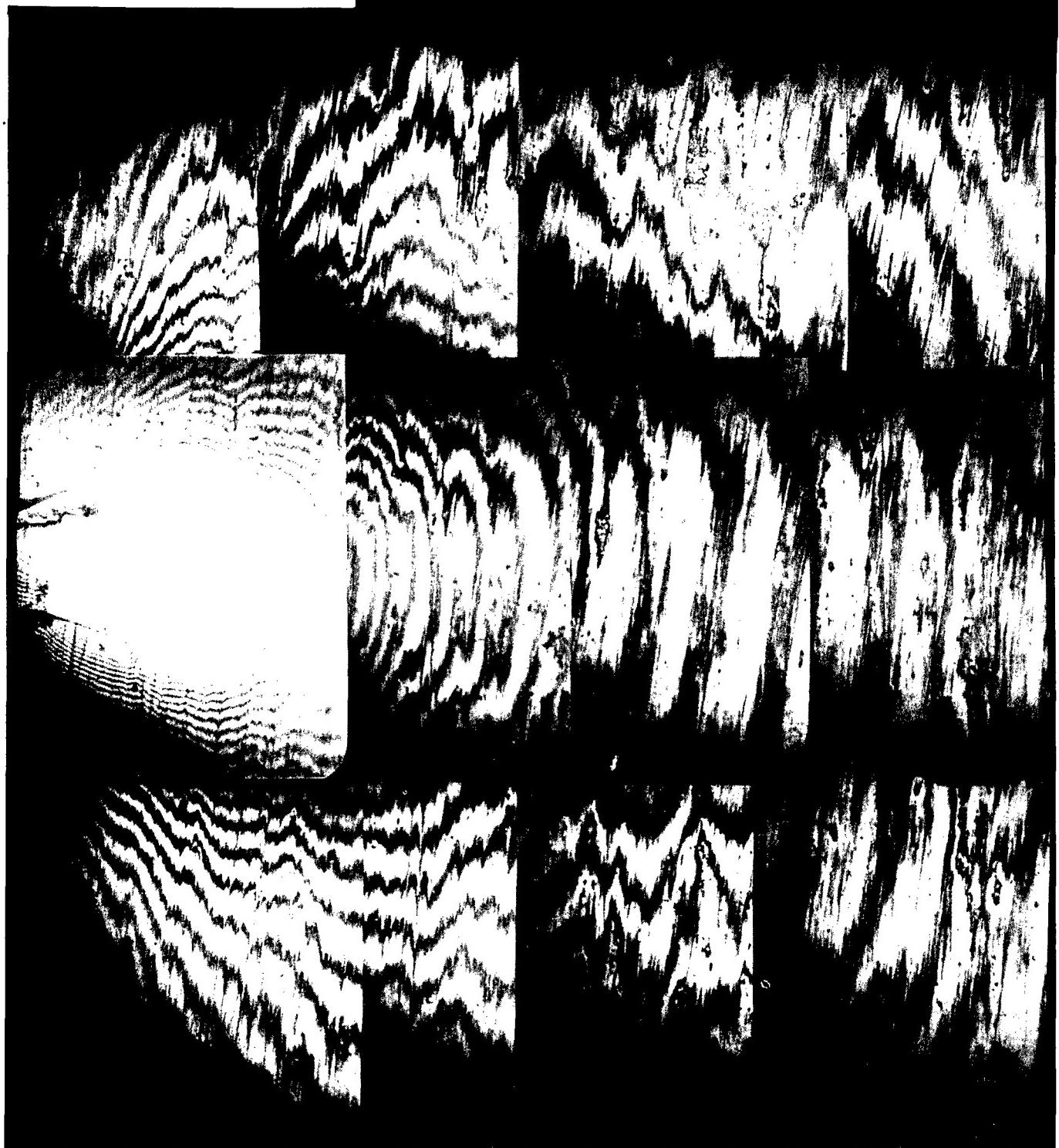


Figure 45. Interferometry Photograph of a Loaded Crack in a
7075-T7351 Specimen

7075-T7351, $a = 0.305$ inch
 $\sigma_x = 15$, $\sigma_y = 30$ ksi unloaded
Magnification: 39.2X
Test Case 63
Specimen 7-16-3.1

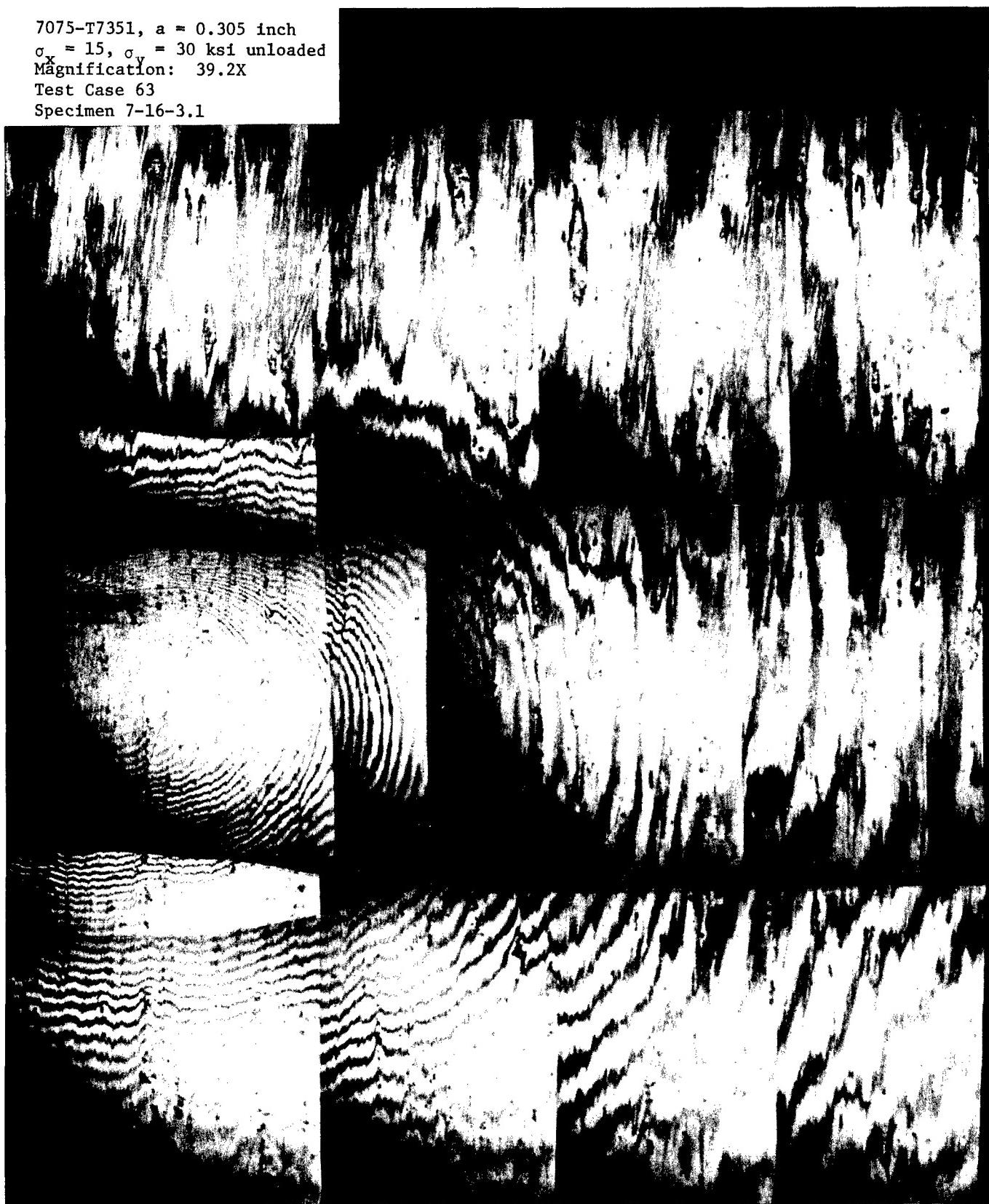


Figure 46. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.305$ inch
 $\sigma_x = 15$, $\sigma_y = 30$ ksi unloaded
Magnification: 34.7X
Test Case 63
Specimen 7-16-3.2

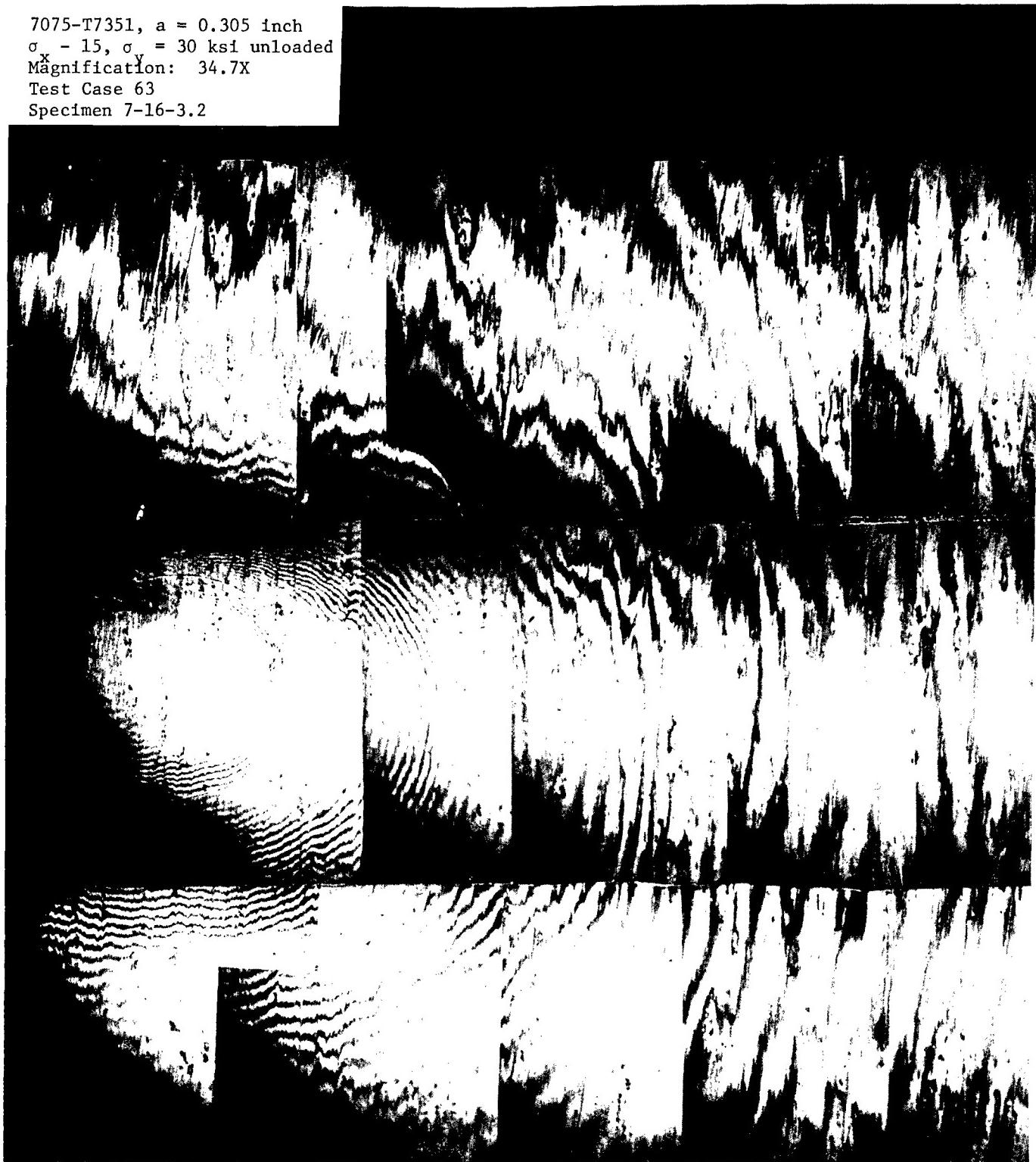


Figure 47. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.305$ inch
 $\sigma_x = 15$, $\sigma_y = 30$ ksi at load
Magnification: 35.4X
Test Case 63
Specimen 7-16-4

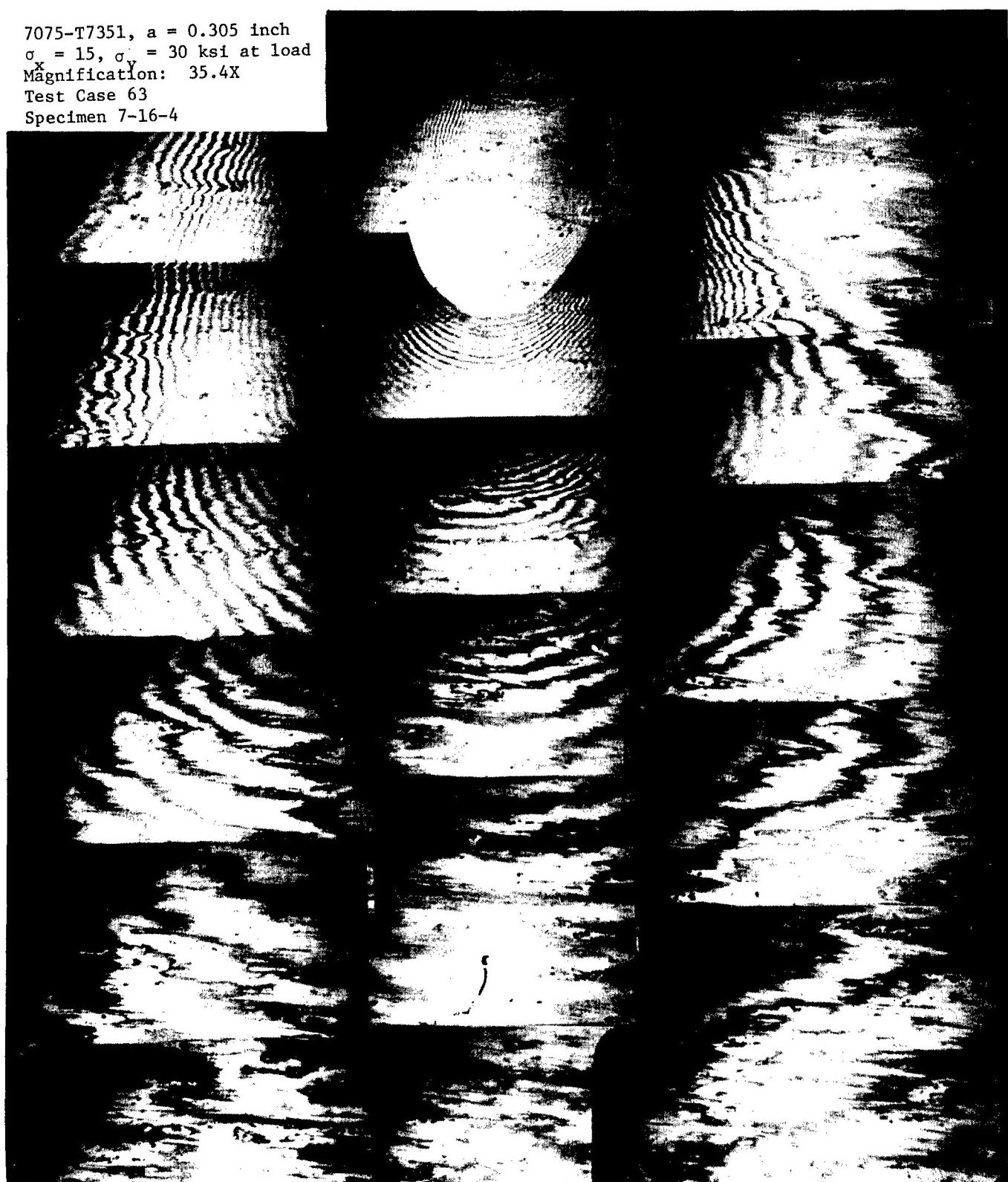


Figure 48. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

2024-T351, $a = 0.4955$ inch
 $\sigma_x = 0$, $\sigma_y = 10$ ksi unloaded
Magnification: 80.9X
Test Case 12
Specimen 2-33-1.



Figure 49. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

2024-T351, $a = 0.495$ inch
 $\sigma_x = 0$, $\sigma_y = 10$ ksi unloaded
Magnification: 65.2X
Test Case 12
Specimen 2-33-1.2



Figure 50. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.74$ inch
 $\sigma_x = 0, \sigma_y = 10$ ksi unloaded
Magnification: 28.8X
Test Case 12
Specimen 2-33-2



Figure 51. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.98$ inch
 $\sigma_x, \sigma_y = 10$ ksi unloaded
Magnification : 46.2X
Test Case 12
Specimen 2-33-3



Figure 52. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 1.495$ inch
 $\sigma_x = 0, \sigma_y = 10$ ksi unloaded
Magnification: 25.9X
Test Case 12
Specimen 2-33-4

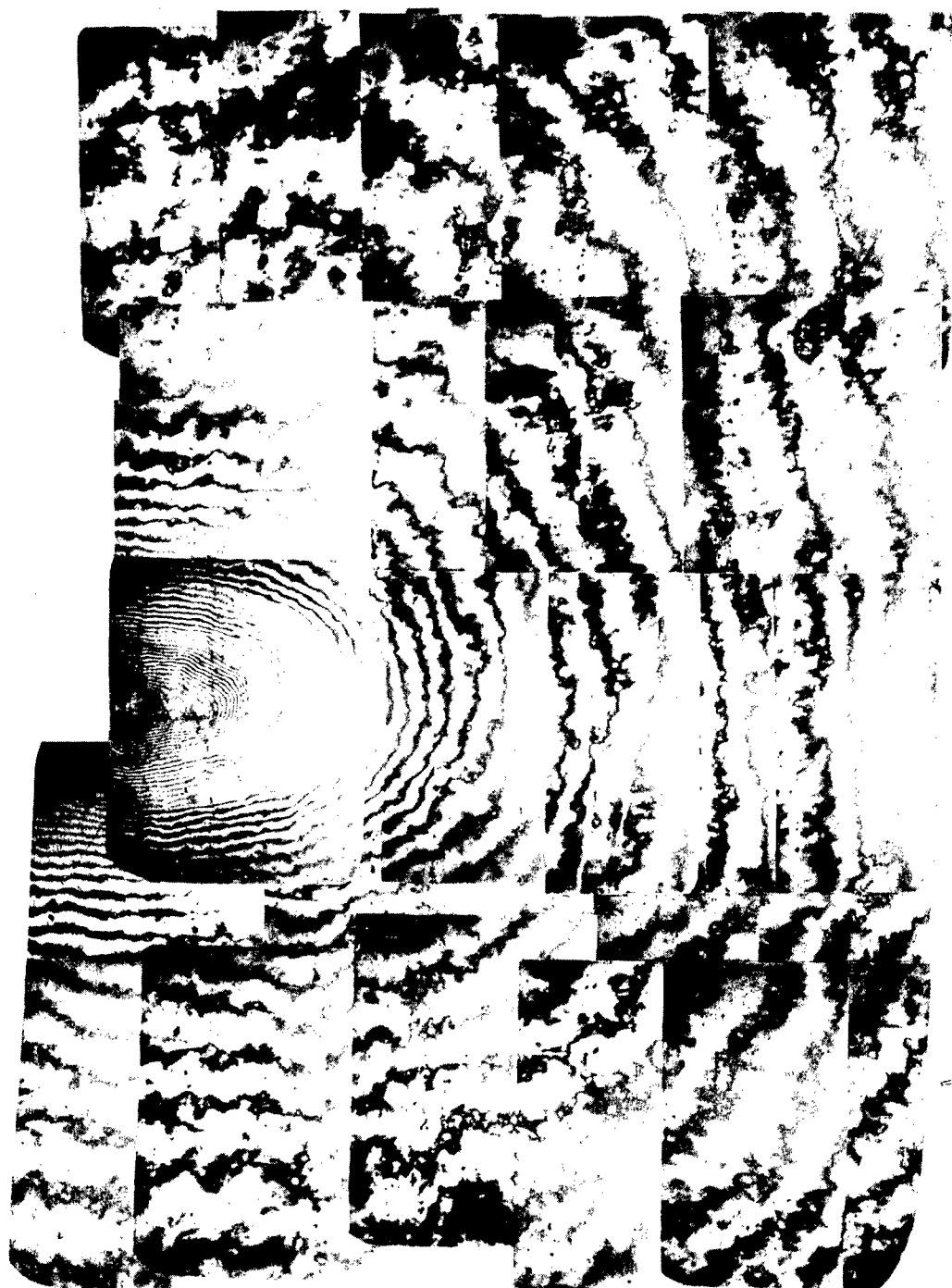


Figure 53. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.24$ inch
 $\sigma_0, \sigma = 10$ ksi unloaded
Magnification: 43.7X
Test Case 10
Specimen 2-6-1

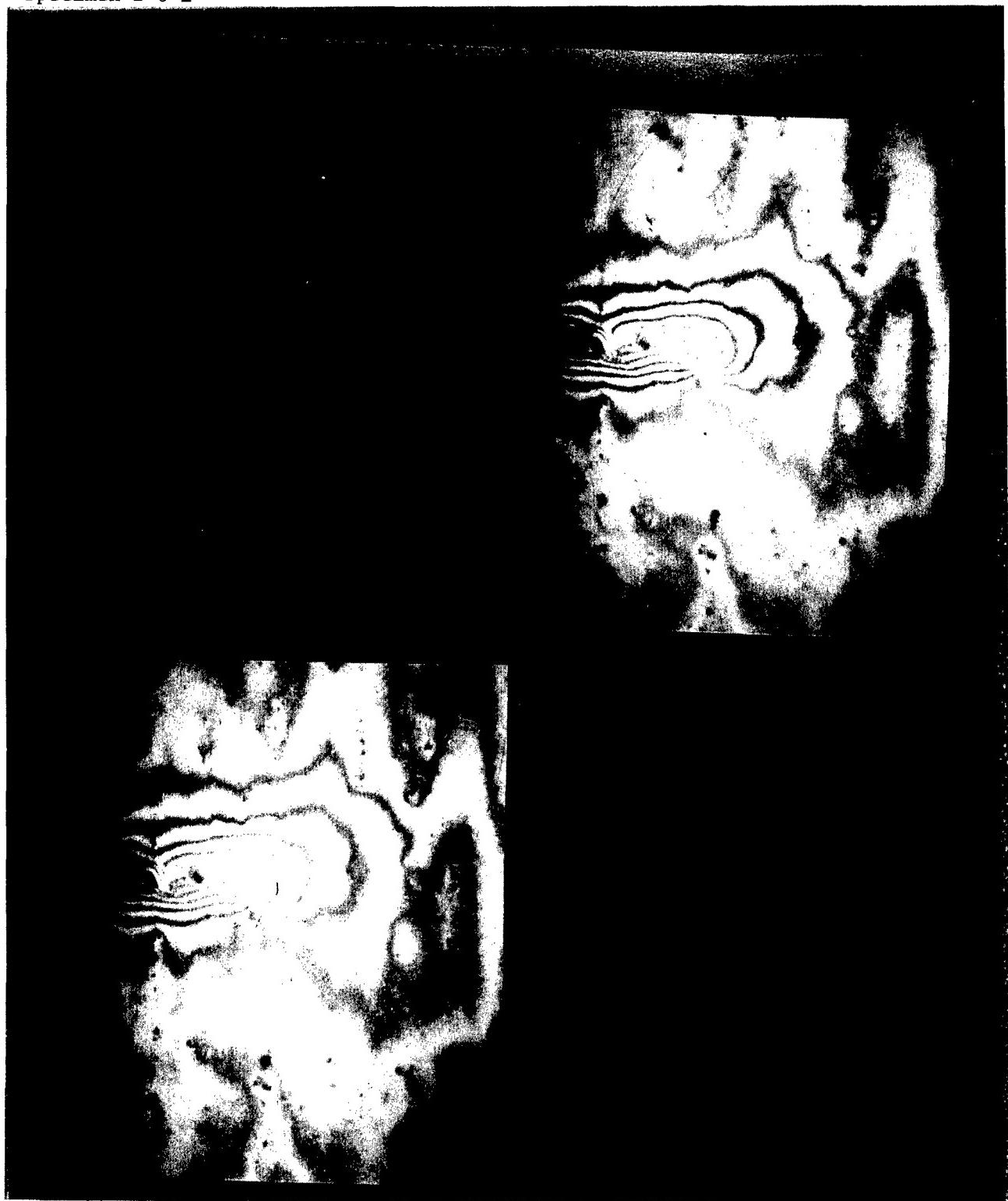


Figure 54. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.24$ inch
 $\sigma_x = 0, \sigma_y = 10$ ksi at load
Magnification: 46.2X
Test Case 10
Specimen 2-6-2



Figure 55. Interferometry Photograph of a Loaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.485$ inch
 $\sigma_x = 0, \sigma_y = 10$ ksi unloaded
Magnification: 45.0X
Test Case 10
Specimen 2-6-3

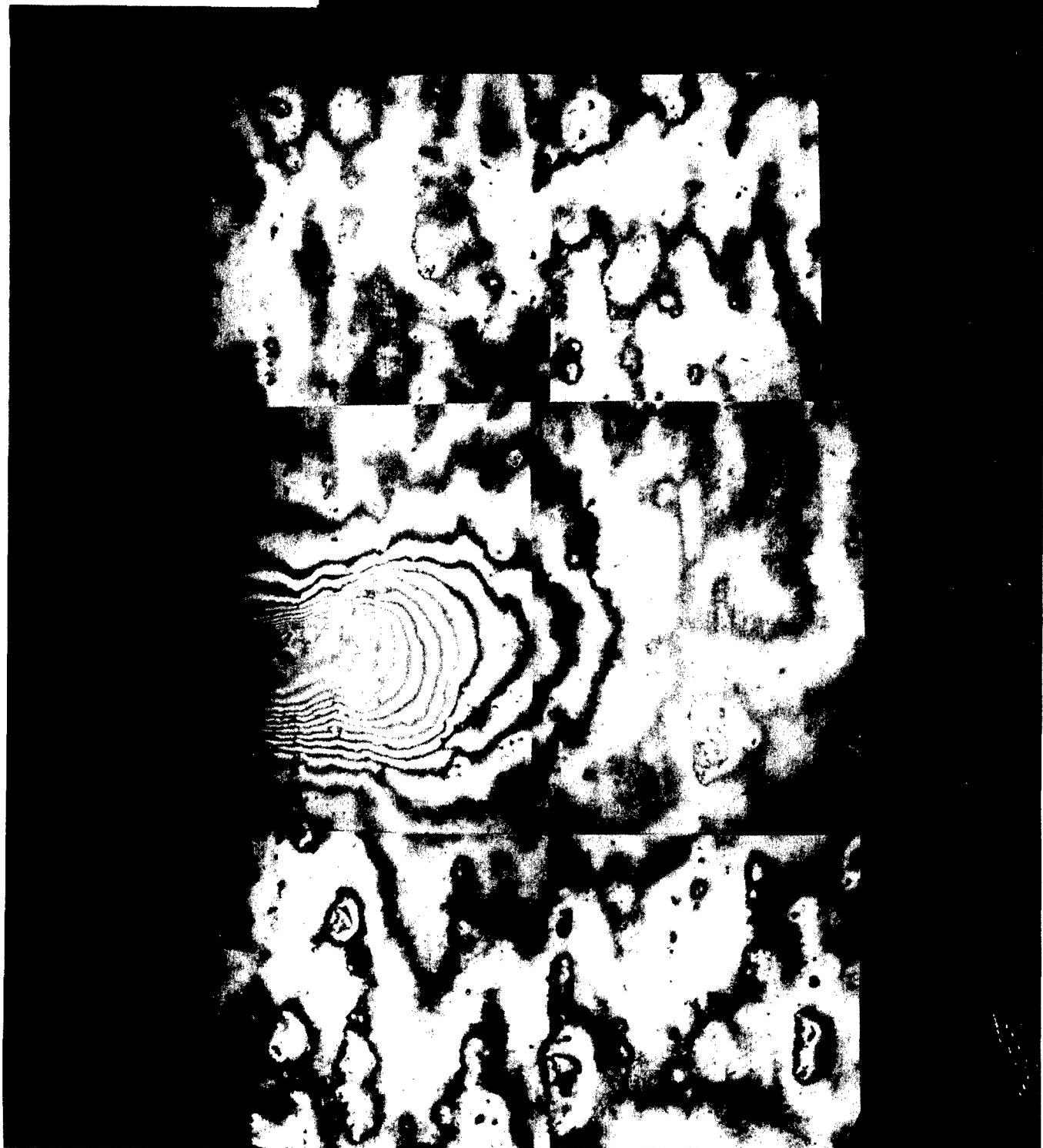


Figure 56. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.485$ inch
 $\sigma = 0, \sigma = 10$ ksi unloaded
Magnification: 46.1X
Test Case 10
Specimen 2-6-4

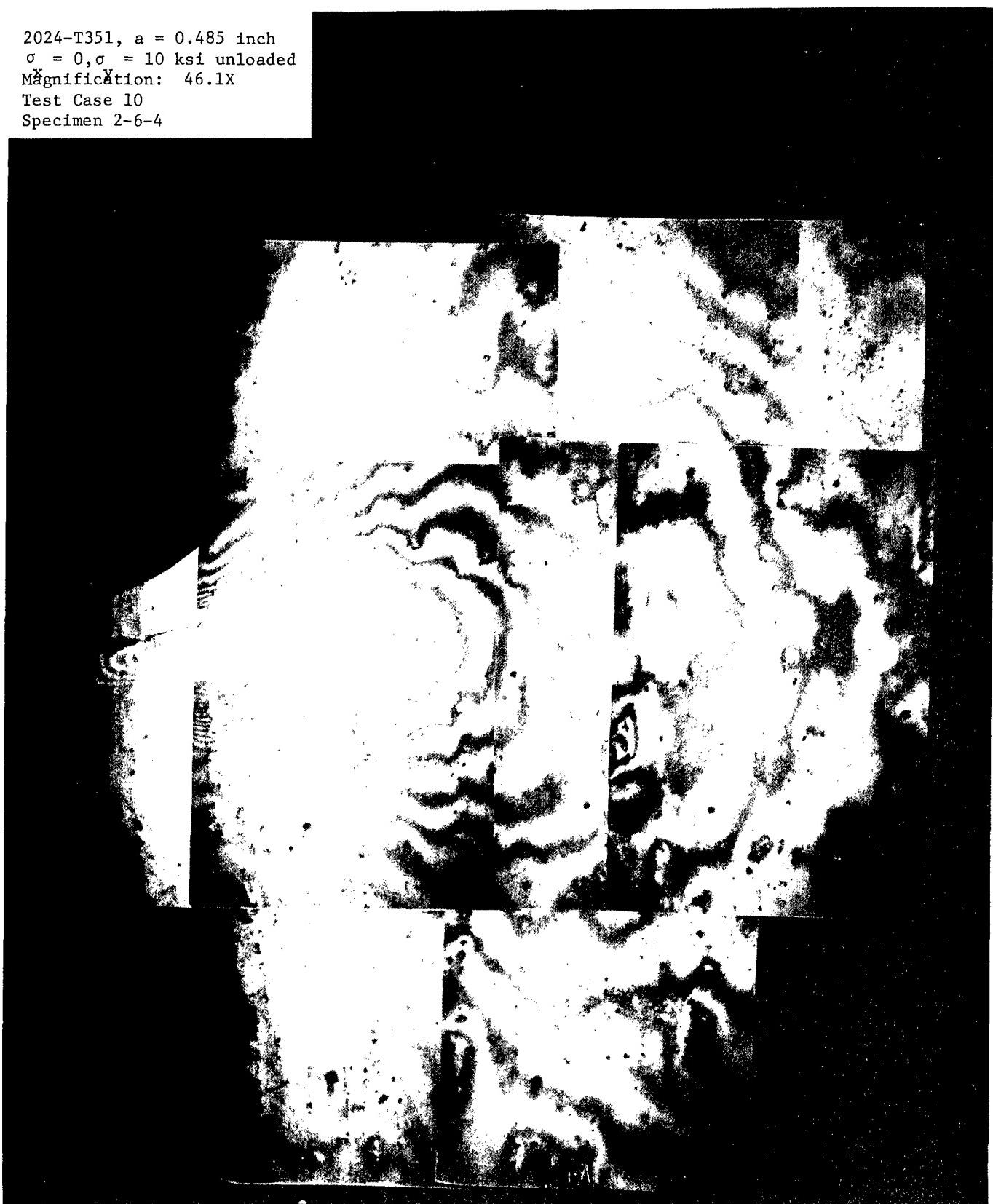


Figure 57. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.745$ inch
 $\sigma_x = 0, \sigma_y = 10$ ksi unloaded
Magnification: 46.7X
Test Case 10
Specimen 2-6-5

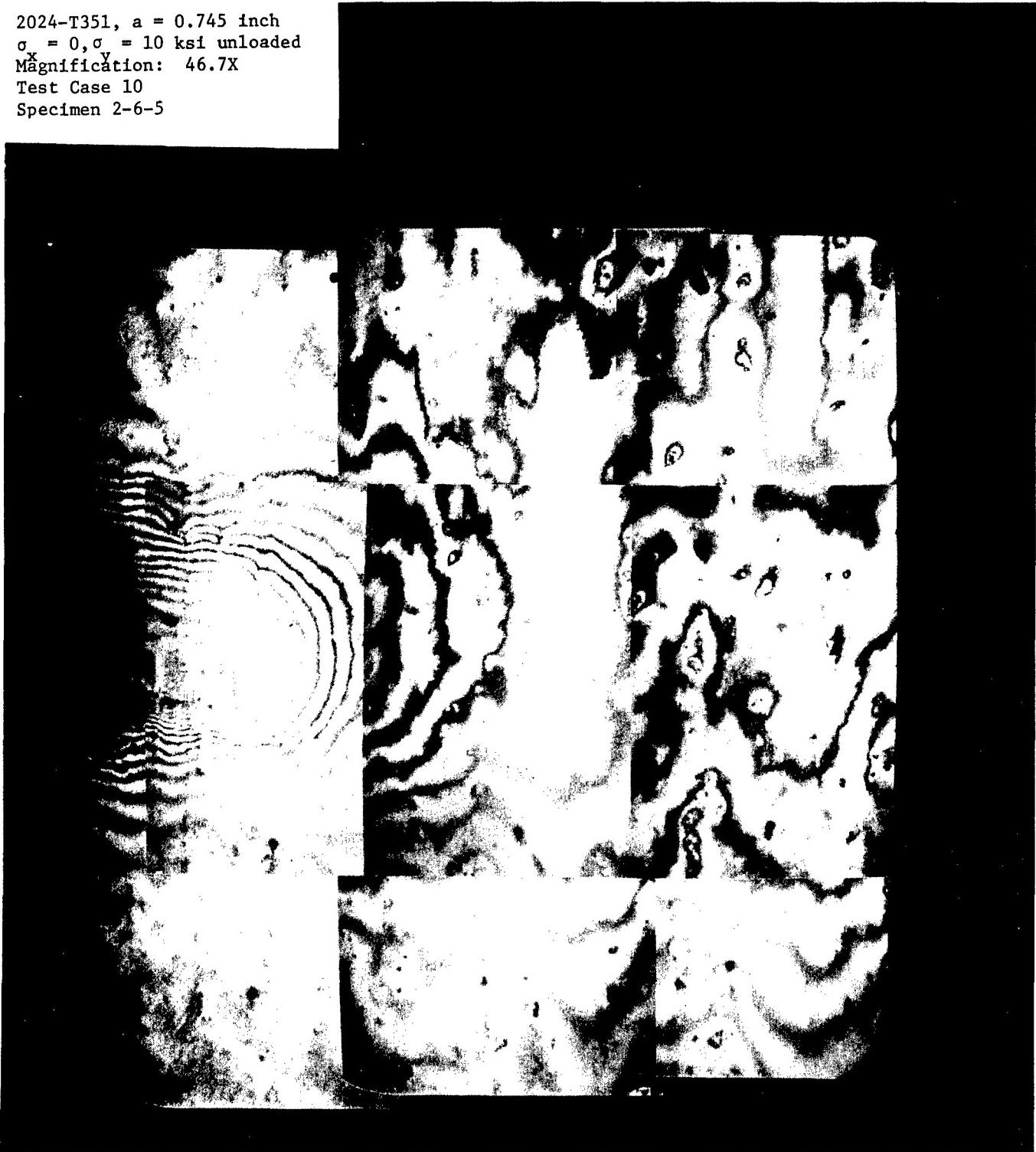


Figure 58. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.745$ inch
 $\sigma_x = 0, \sigma_y = 10$ ksi unloaded
Magnification: 45.0X
Test Case 10
Specimen 2-6-6



Figure 59. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.99$ inch
 $\sigma_x = 0, \sigma_y = 10$ ksi unloaded
Magnification: 44.8X
Test Case 10
Specimen 2-6-7



Figure 60. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.99$ inch
 $\sigma_x = 0, \sigma_y = 10$ ksi at load
Magnification: 42.5X
Test Case 10
Specimen 2-6-8

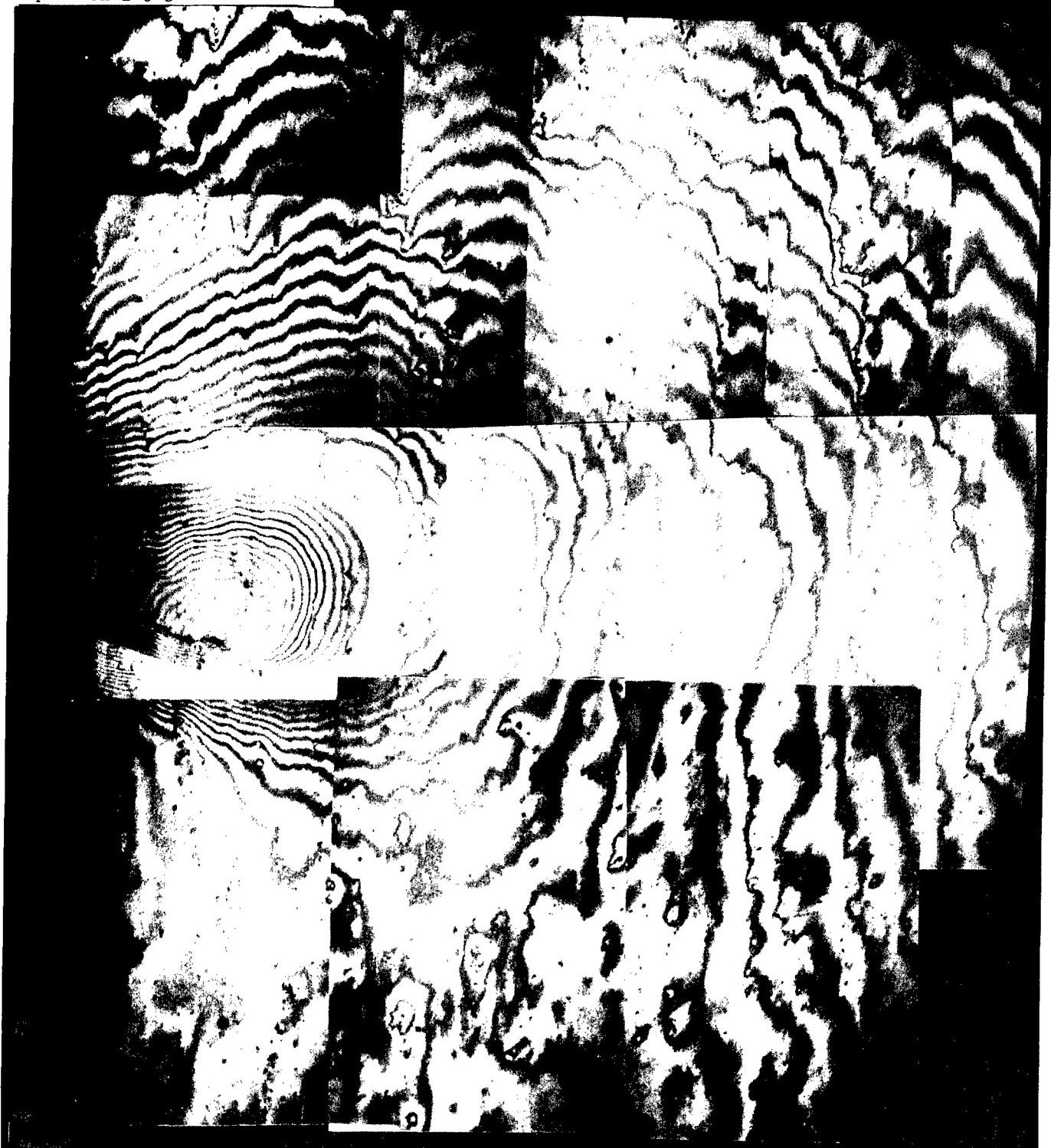


Figure 61. Interferometry Photograph of a Loaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.11$ inch
 $\sigma_x = 15$, $\sigma_y = 15$ ksi unloaded
Magnification: 47.0X
Test Case 59
Specimen 2-5-1

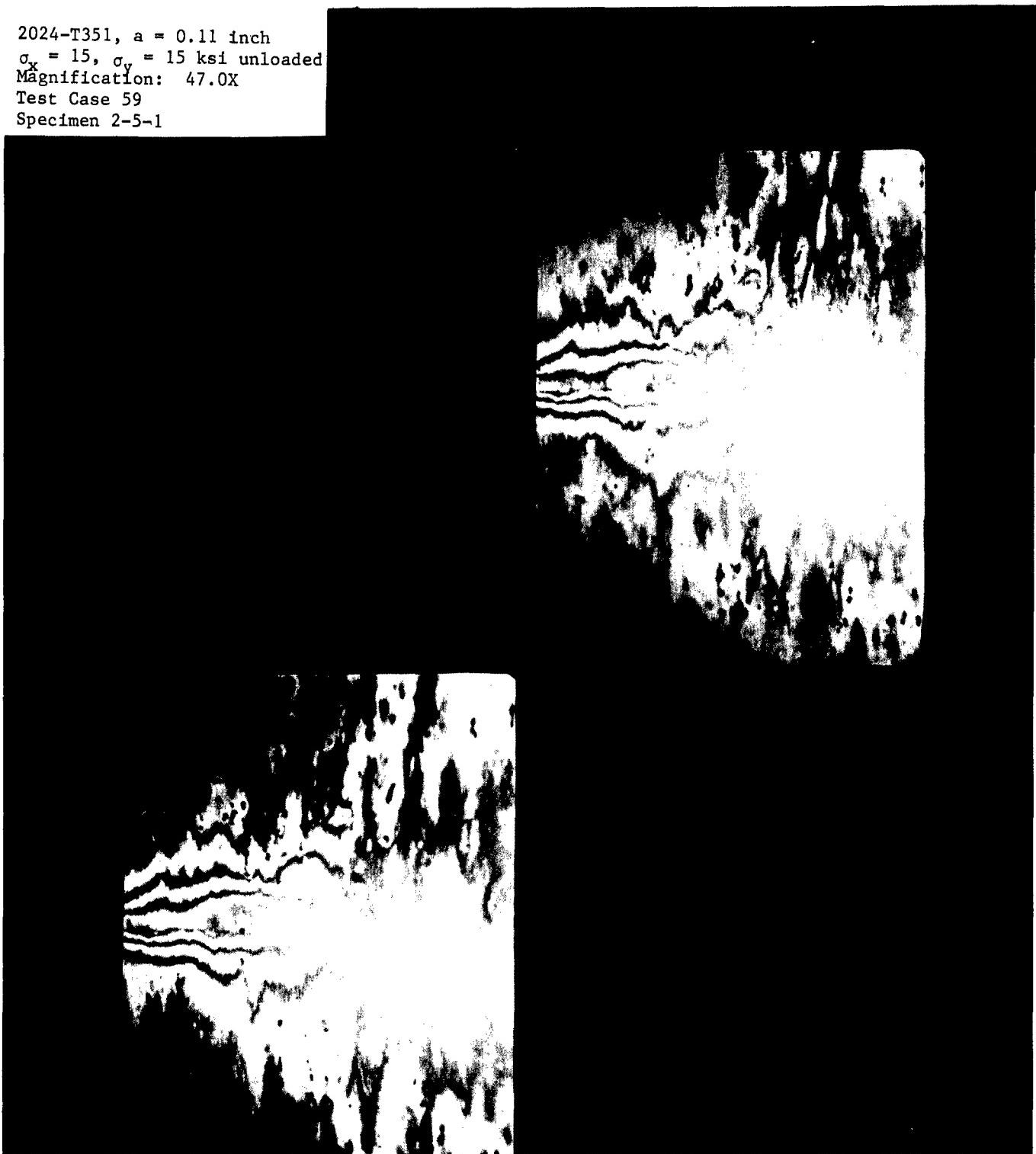


Figure 62. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.11$ inch
 $\sigma_x = 15$, $\sigma_y = 15$ ksi at load
Magnification: 46.7X
Test Case 59
Specimen 2-5-2

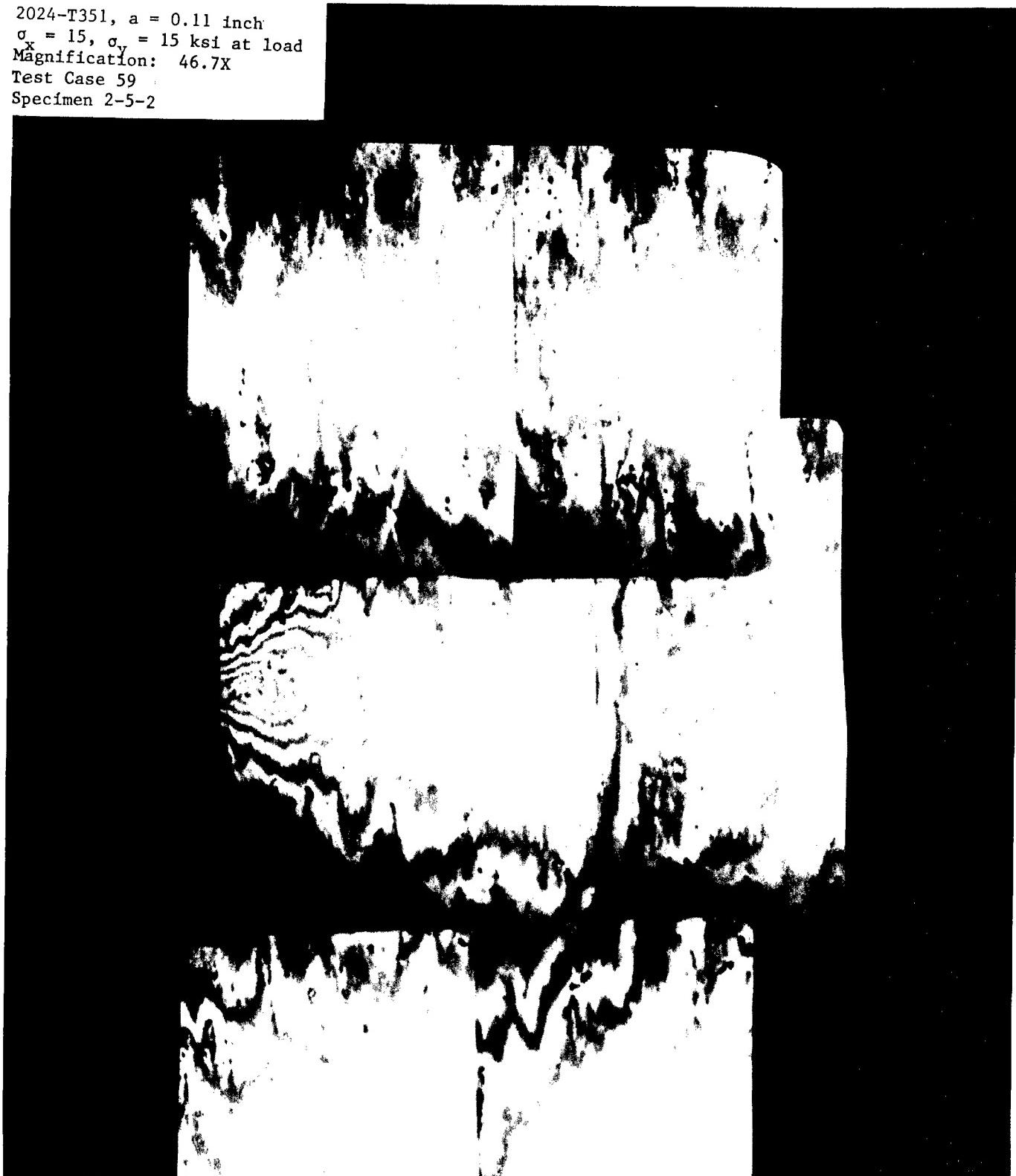


Figure 63. Interferometry Photograph of a Loaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.205$ inch
 $\sigma_x = 15$, $\sigma_y = 15$ ksi unloaded
Magnification: 46.9X
Test Case 59
Specimen 2-5-3

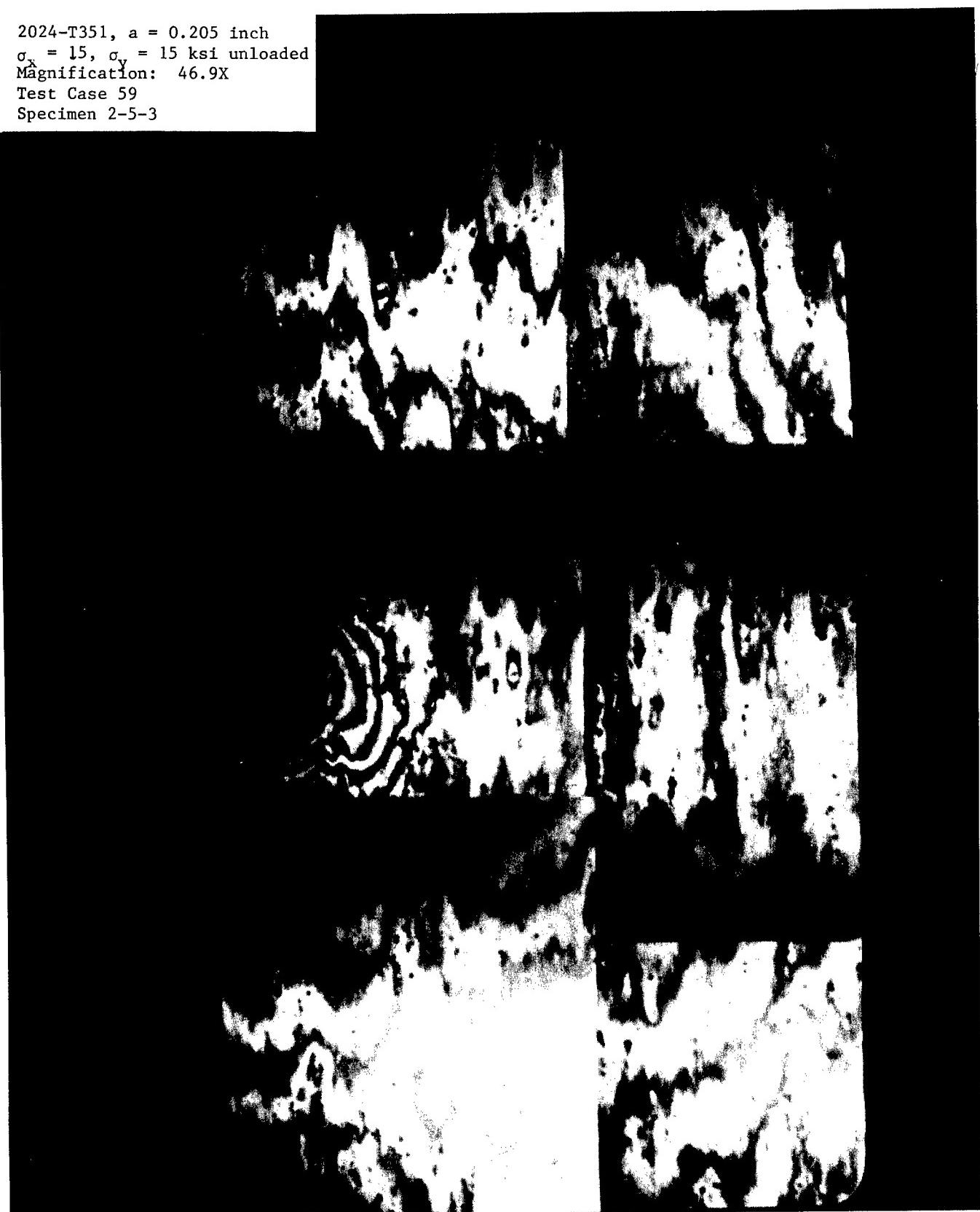


Figure 64. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.205$ inch
 $\sigma_x = 15$, $\sigma_y = 15$ ksi at load
Magnification: 46.8X
Test Case 59
Specimen 2-5-4



Figure 65. Interferometry Photograph of a Loaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.425$ inch
 $\sigma_x = 15$, $\sigma_y = 15$ ksi unloaded
Magnification: 46.2X
Test Case 59
Specimen 2-5-5

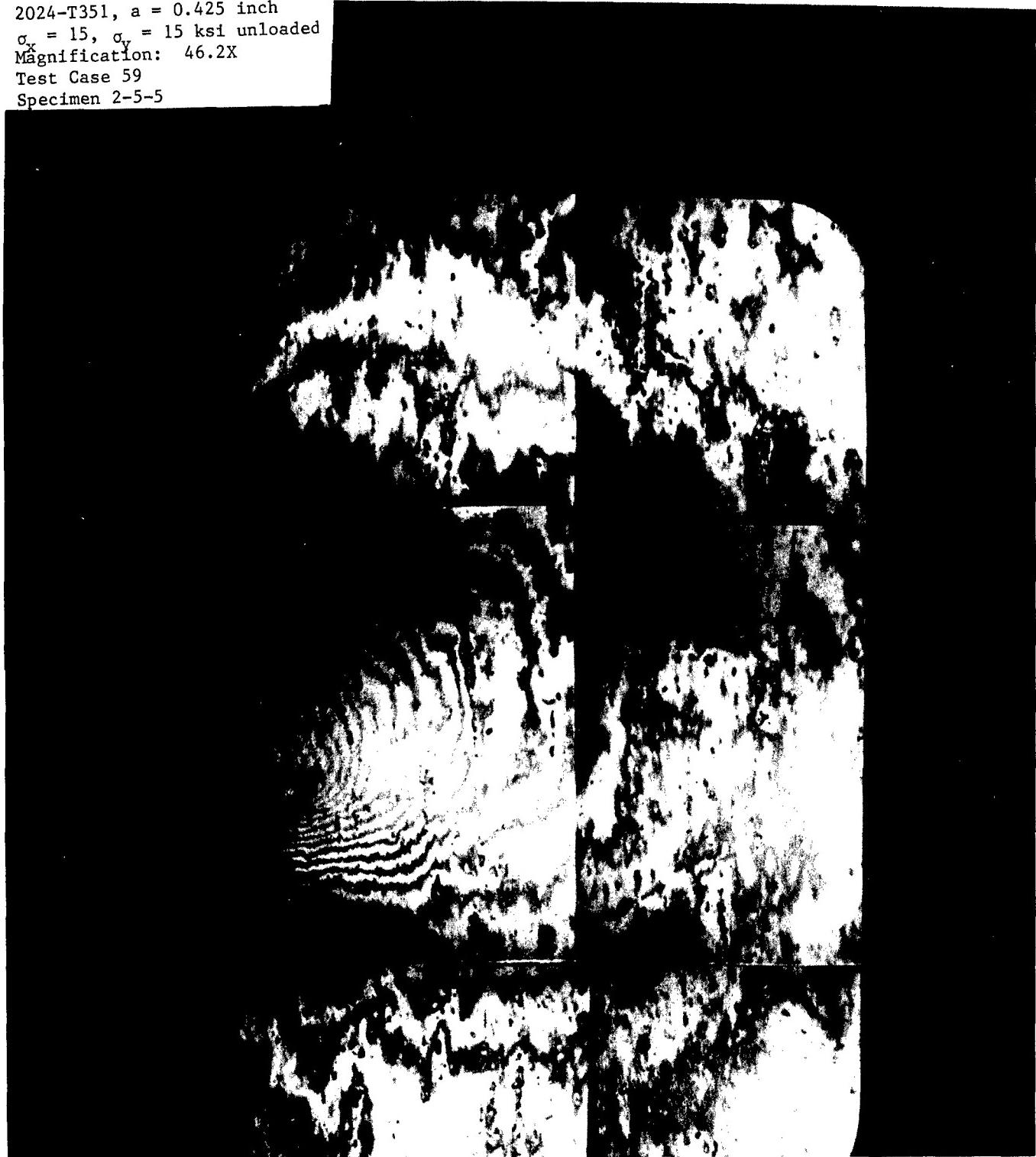


Figure 66. Interferometry Photograph of a Loaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.425$ inch
 $\sigma_x = 15$, $\sigma_y = 15$ ksi at load
Magnification: 41.1X
Test Case 59
Specimen 2-5-6

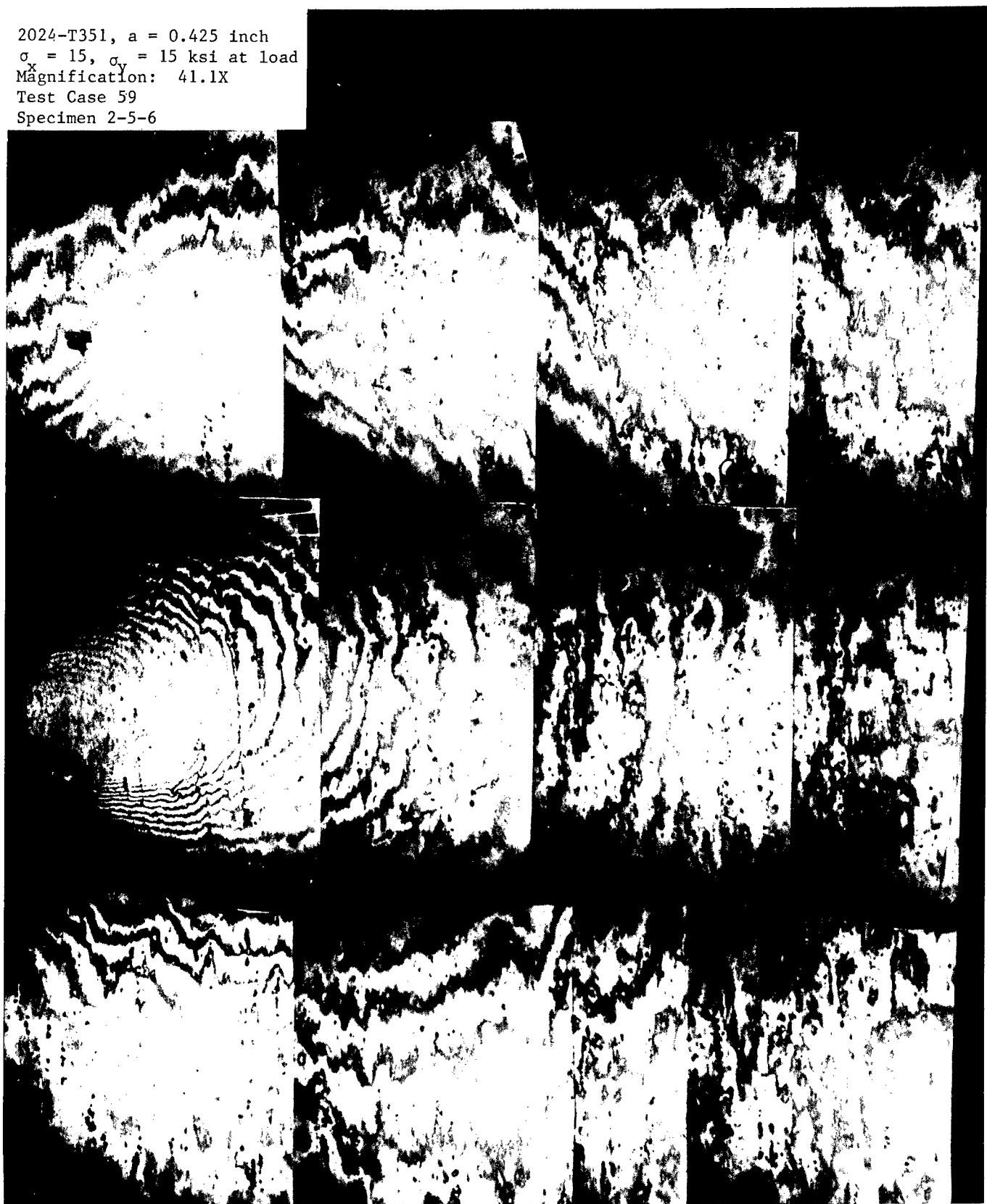


Figure 67. Interferometry Photograph of a Loaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.27$ inch
 $\sigma_x = -1.0$, $\sigma_y = 10$ ksi unloaded
Magnification: 47.0X
Test Case 33
Specimen 2-44-1

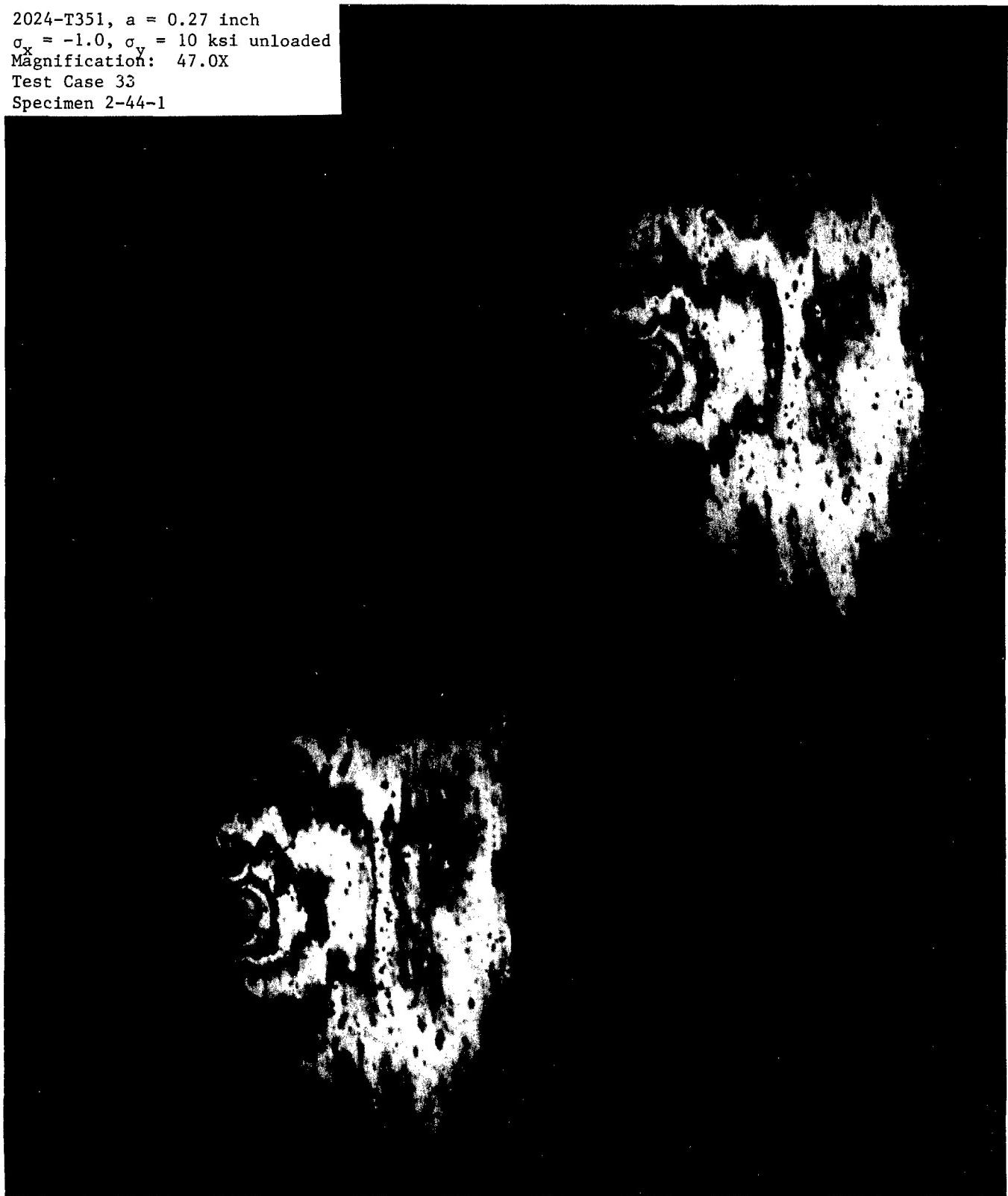


Figure 68. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.27$ inch
 $\sigma_x = -1.0$, $\sigma_y = 10$ ksi at load
Magnification: 45.4X
Test Case 33
Specimen 2-44-2

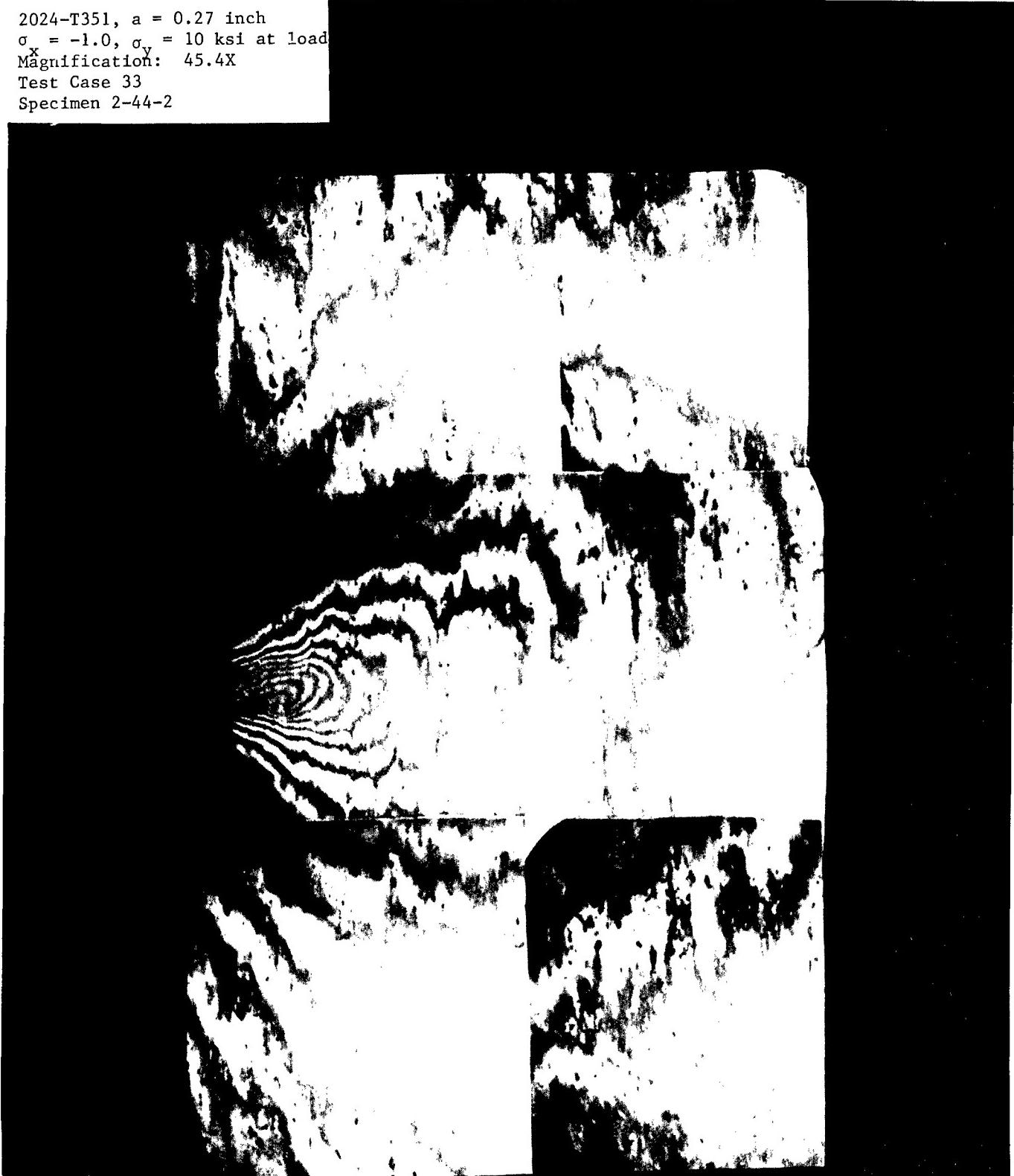


Figure 69. Interferometry Photograph of a Loaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.52$ inch
 $\sigma_x = -1.0$, $\sigma_y = 10$ ksi unloaded
Magnification: 46.2X
Test Case 33
Specimen 2-44-3



Figure 70. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.52$ inch
 $\sigma_x = -1.0$, $\sigma_y = 10$ ksi at load
Magnification: 46.6X
Test Case 33
Specimen 2-44-4

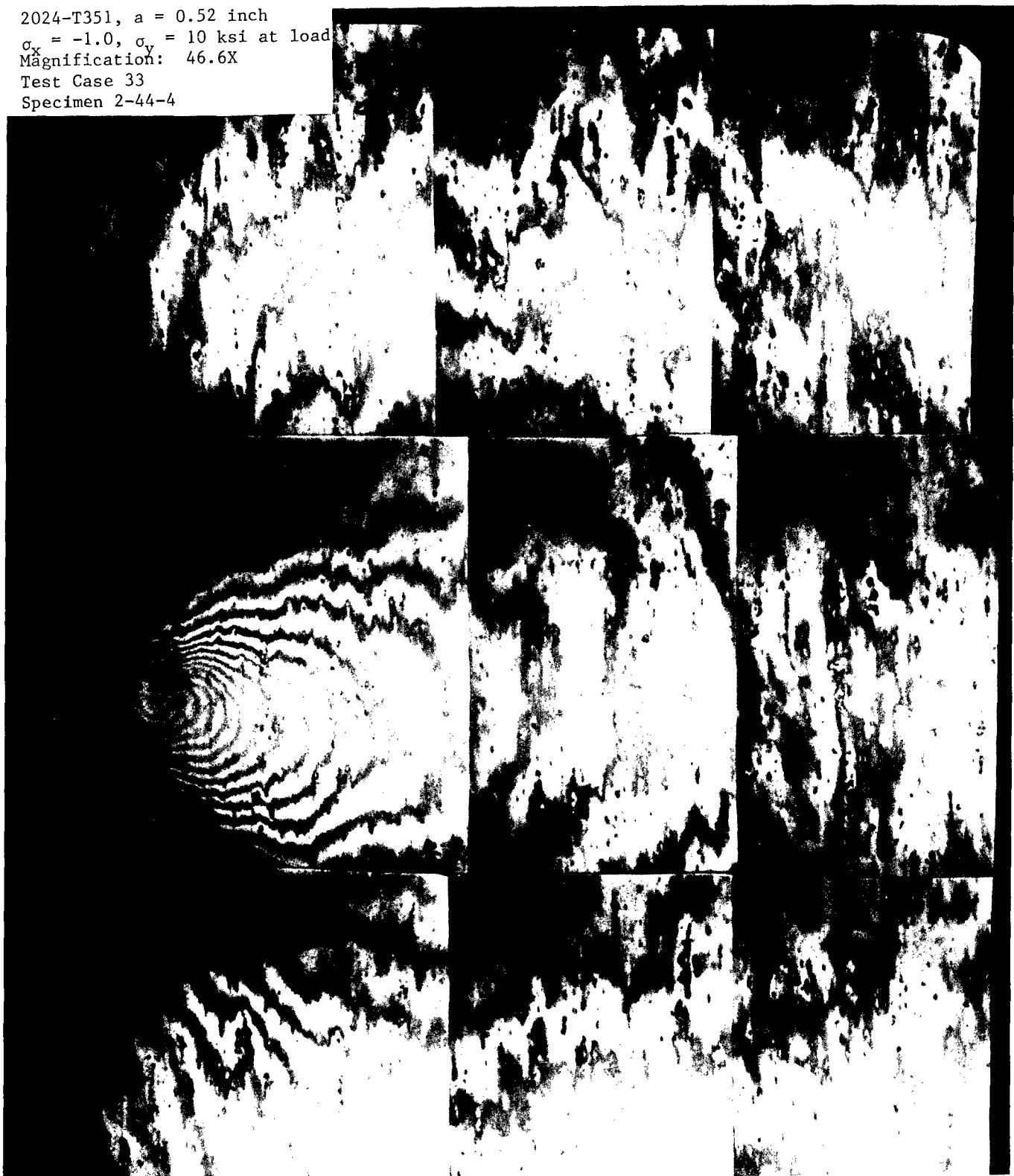


Figure 71. Interferometry Photograph of a Loaded Crack in a 2024-T351 Specimen

2024-T351, $a = 1.02$ inch
 $\sigma_x = -1.0$, $\sigma_y = 10$ ksi unloaded
Magnification: 46.9X
Test Case 33
Specimen 2-44-5

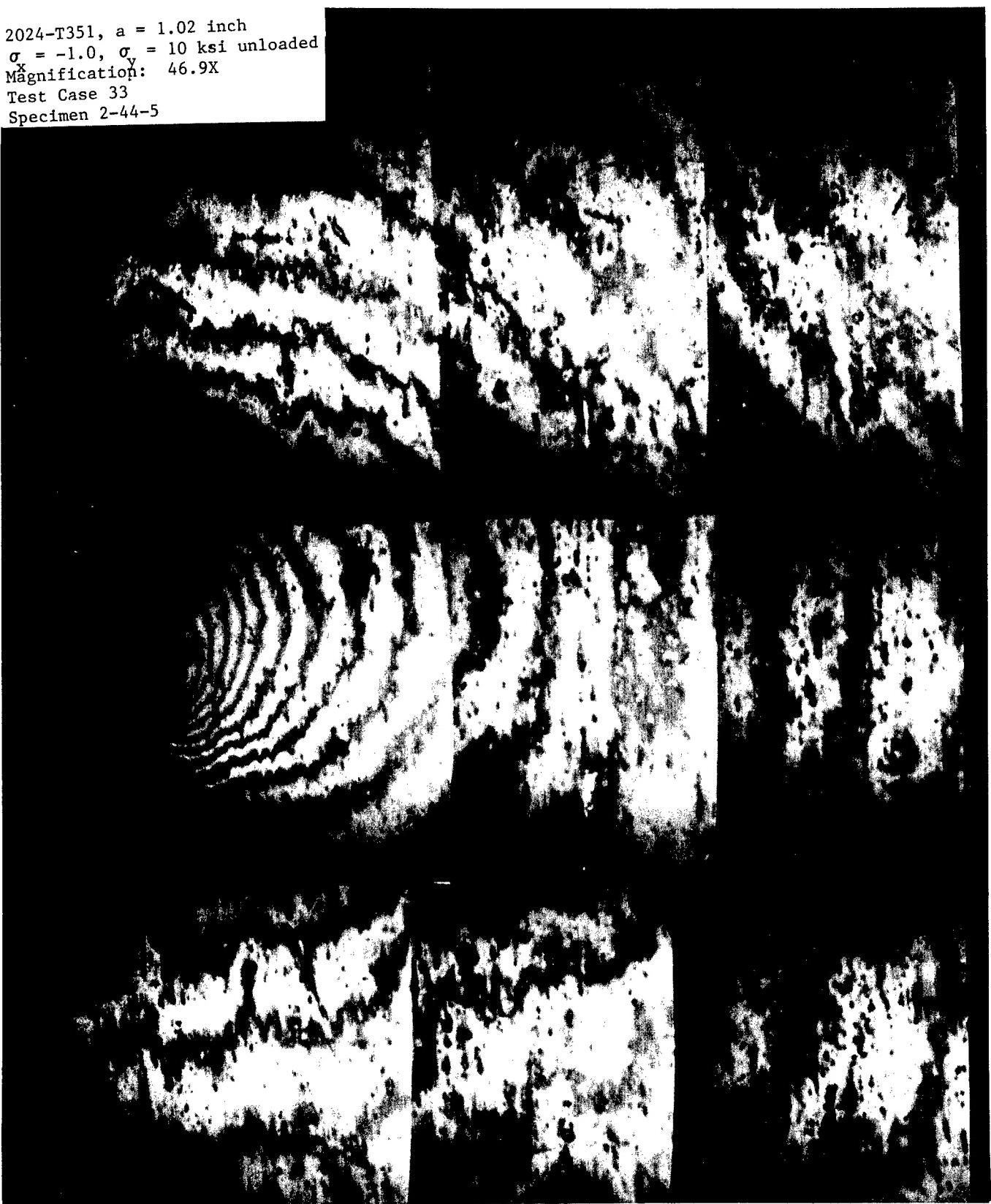


Figure 72. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 1.02$ inch
 $\sigma_x = -1.0$, $\sigma_y = 10$ ksi at load
Magnification: 47.3X
Test Case 33
Specimen 2-44-6



Figure 73. Interferometry Photograph of a Loaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.24$ inch
 $\sigma_x = 10$, $\sigma_y = 10$ ksi unloaded
Magnification: 48.3X
Test Case 31
Specimen 2-43-1

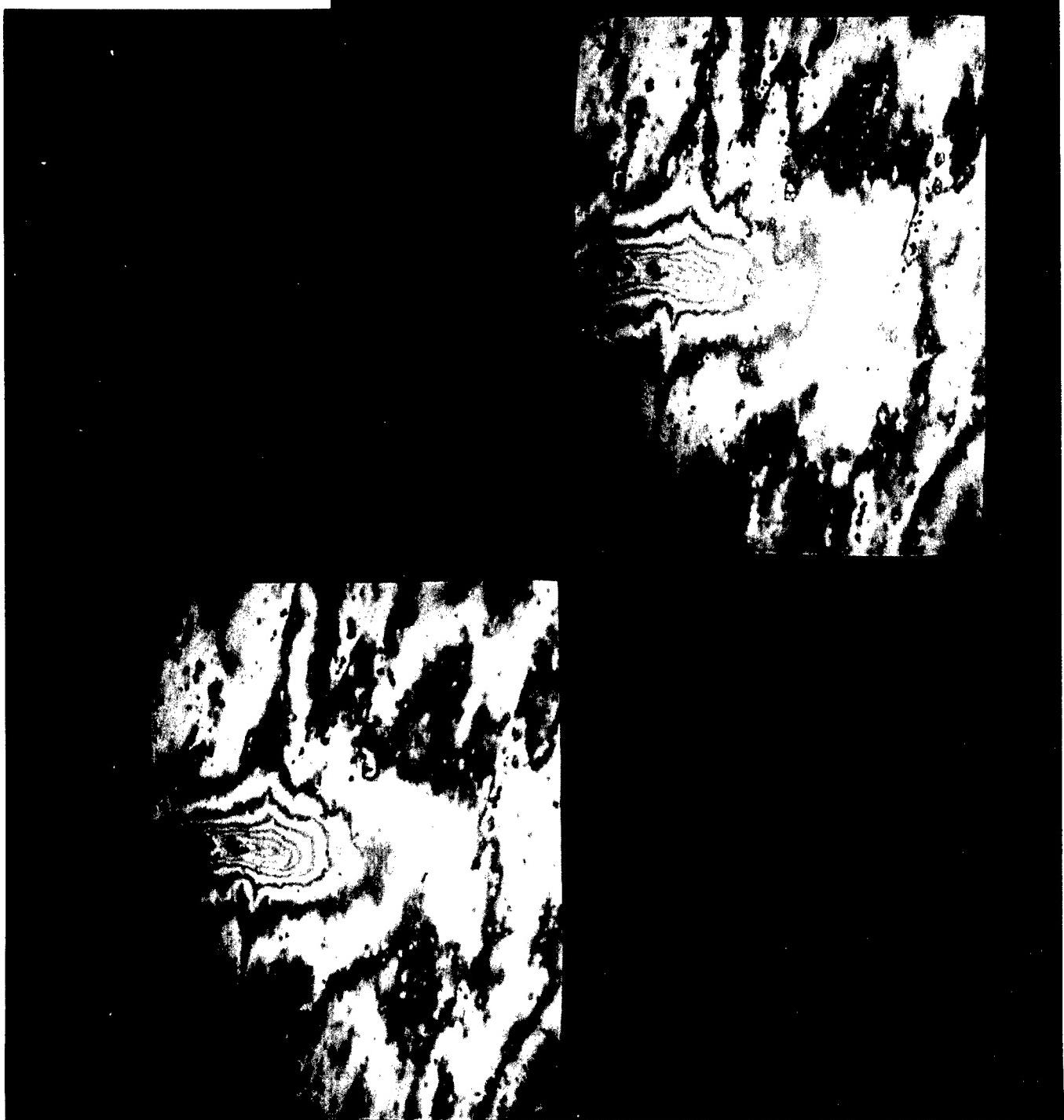


Figure 74. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.24$ inch
 $\sigma_x = 10$, $\sigma_y = 10$ ksi at load
Magnification: 47.7X
Test Case 31
Specimen 2-43-2

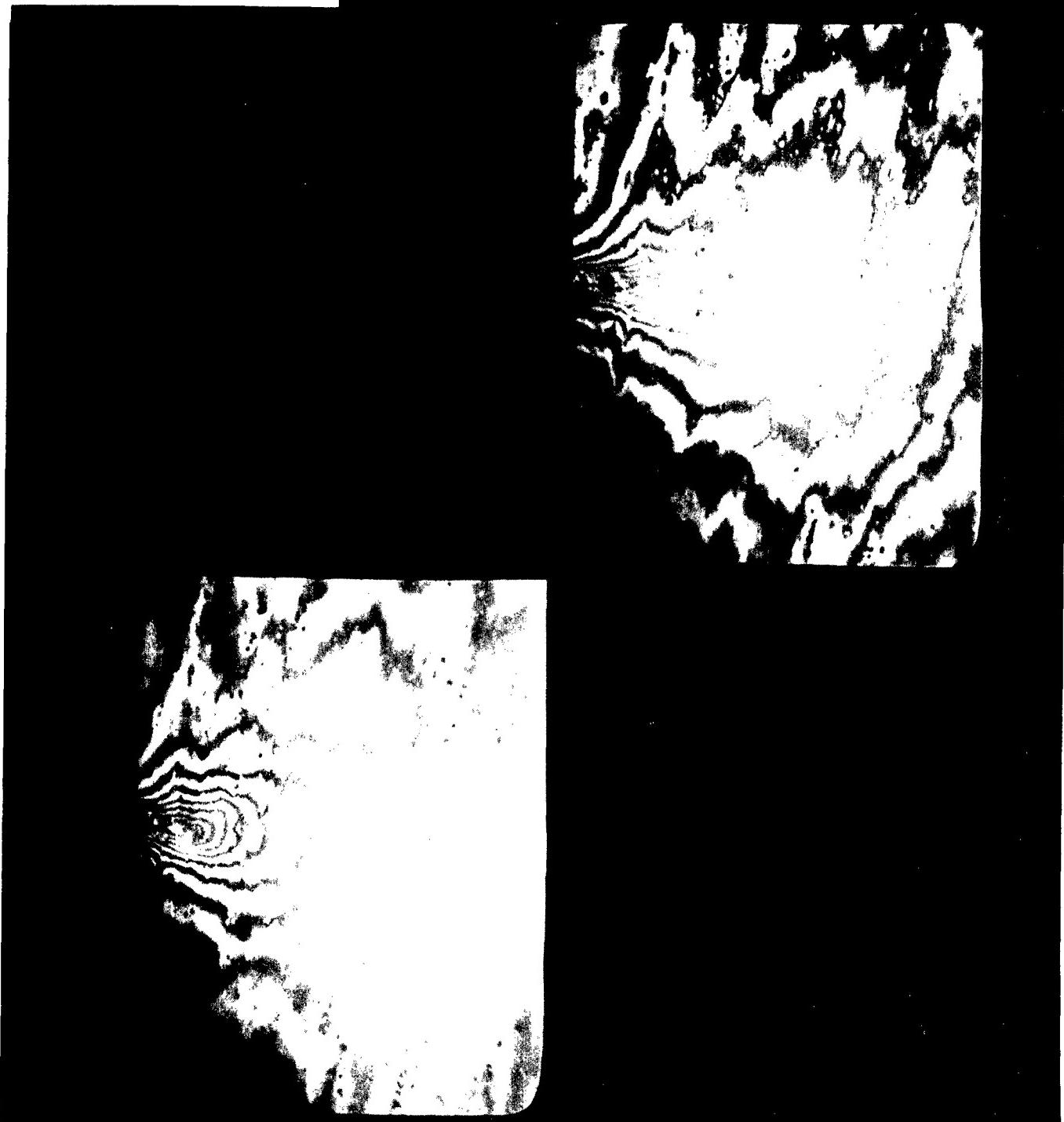


Figure 75. Interferometry Photograph of a Loaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.49$ inch
 $\sigma_x = 10$, $\sigma_y = 10$ ksi unloaded
Magnification: 47.2X
Test Case 31
Specimen 2-43-3

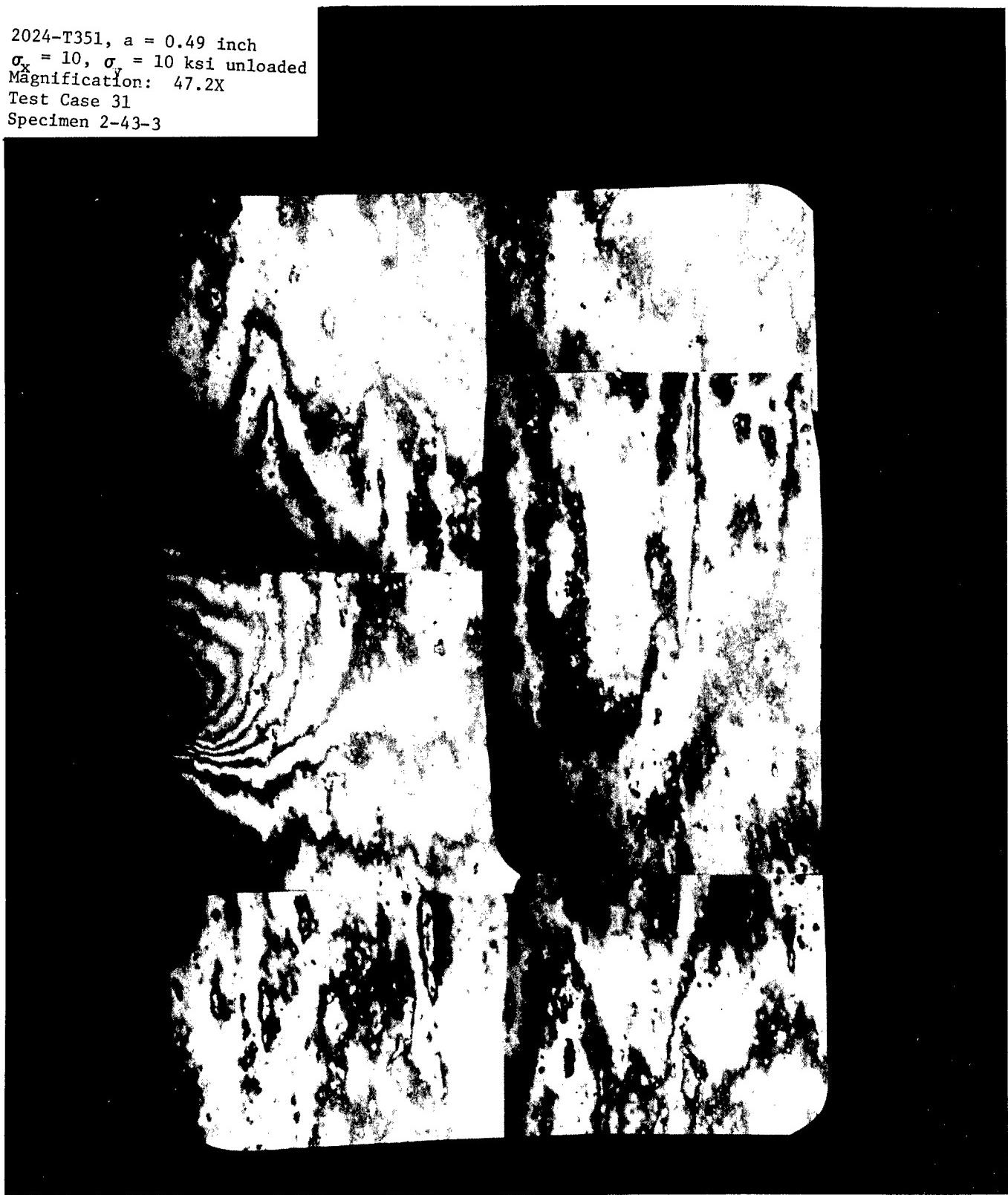


Figure 76. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.49$ inch
 $\sigma_x = 10$, $\sigma_y = 10$ ksi at load
Magnification: 48.0X
Test Case 31
Specimen 2-43-4



Figure 77. Interferometry Photograph of a Loaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.98$ inch
 $\sigma_x = 10$, $\sigma_y = 10$ ksi unloaded
Magnification: 48.3
Test Case 31
Specimen 2-43-5



Figure 78. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.98$ inch
 $\sigma_x = 10$, $\sigma_y = 10$ ksi at load
Magnification: 42.4X
Test Case 31
Specimen 2-43-6



Figure 79. Interferometry Photograph of a Loaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.105$ inch
 $\sigma_x = -1.5$, $\sigma_y = 15$ ksi unloaded
Magnification: 47.5X
Test Case 60
Specimen 2-40-1

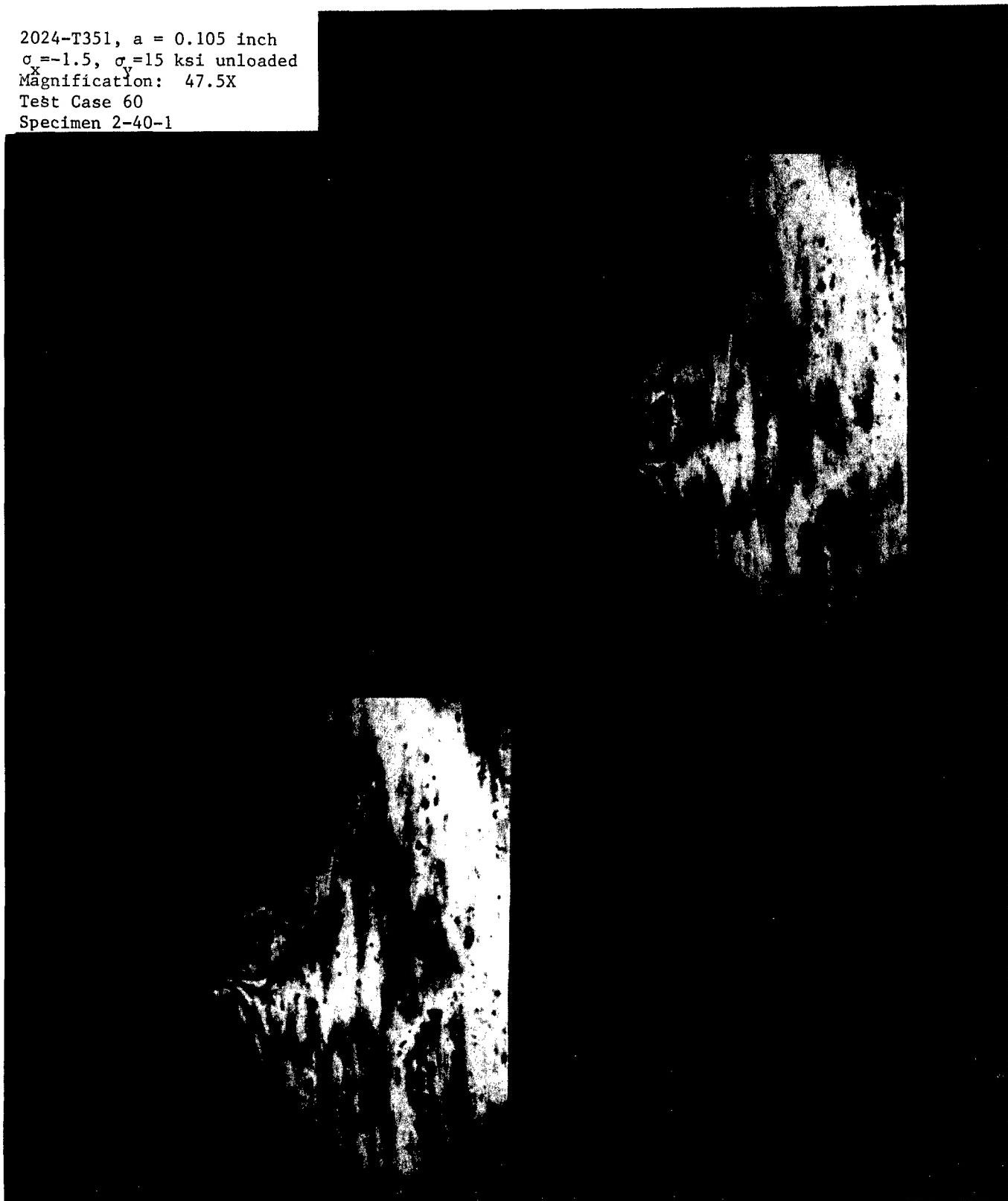


Figure 80. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.105$ inch
 $\sigma_x = -1.5$, $\sigma_y = 15$ ksi at load
Magnification: 47.1X
Test Case 60
Specimen 2-40-2



Figure 81. Interferometry Photograph of a Loaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.23$ inch
 $\sigma_x = -1.5$, $\sigma_y = 15$ ksi unloaded
Magnification: 45.9X
Test Case 60
Specimen 2-40-3

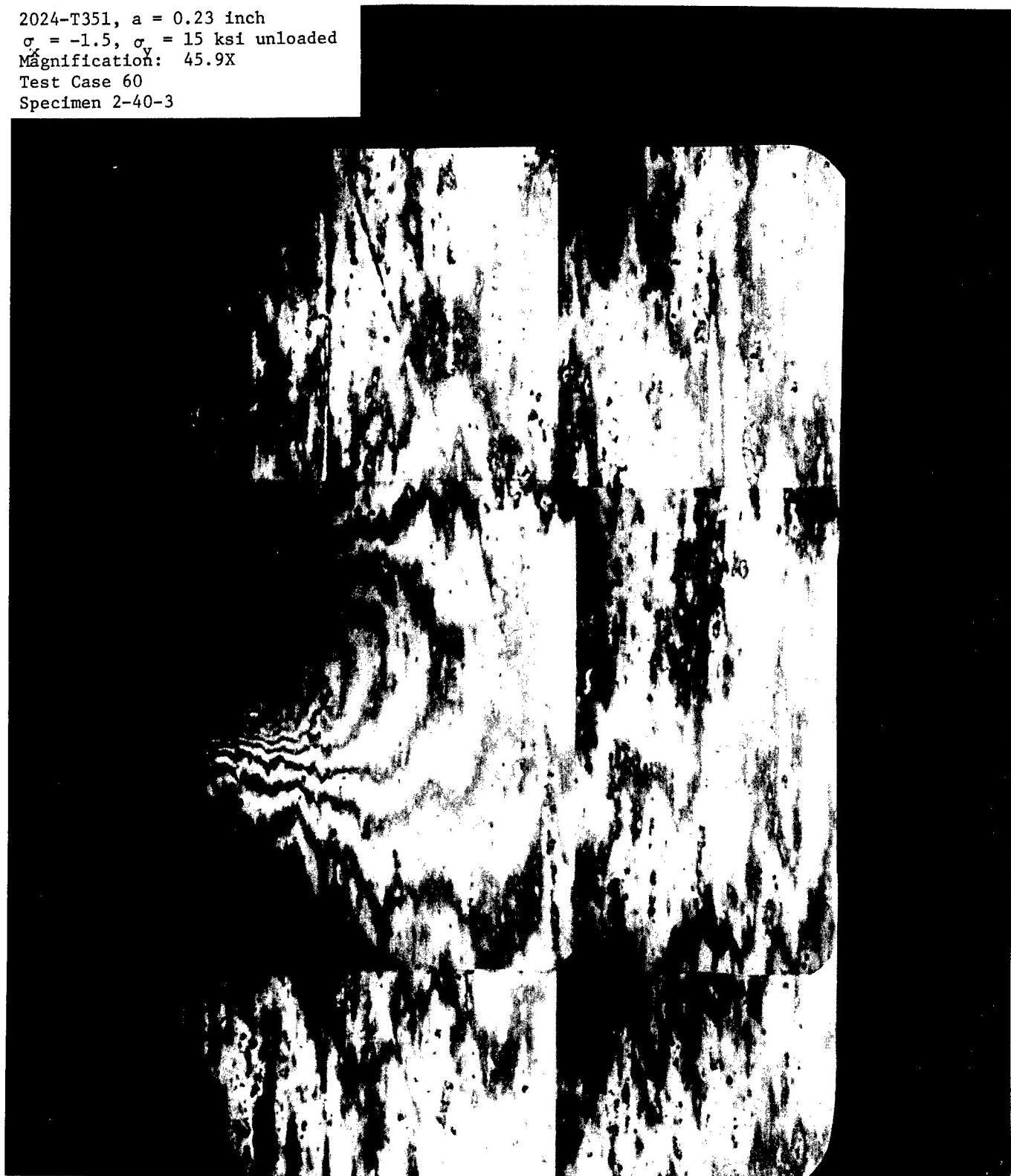


Figure 82. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.23$ inch
 $\sigma_x = -1.5$, $\sigma_y = 15$ ksi at load
Magnification: 46.3X
Test Case 60
Specimen 2-40-4

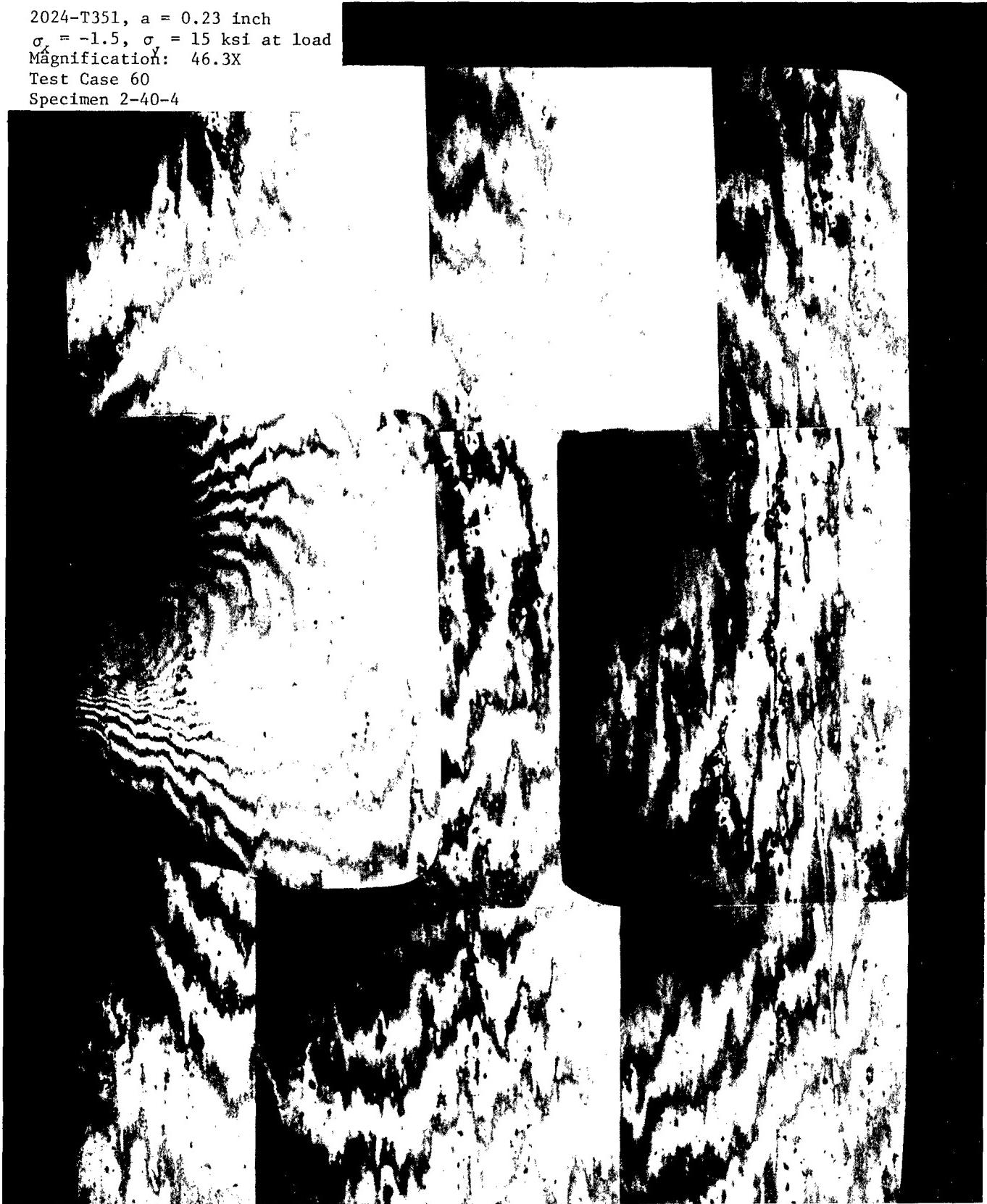


Figure 83. Interferometry Photograph of a Loaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.435$ inch
 $\sigma_x = -1.5$, $\sigma_y = 15$ ksi unloaded
Magnification: 45.6X
Test Case 60
Specimen 2-40-5

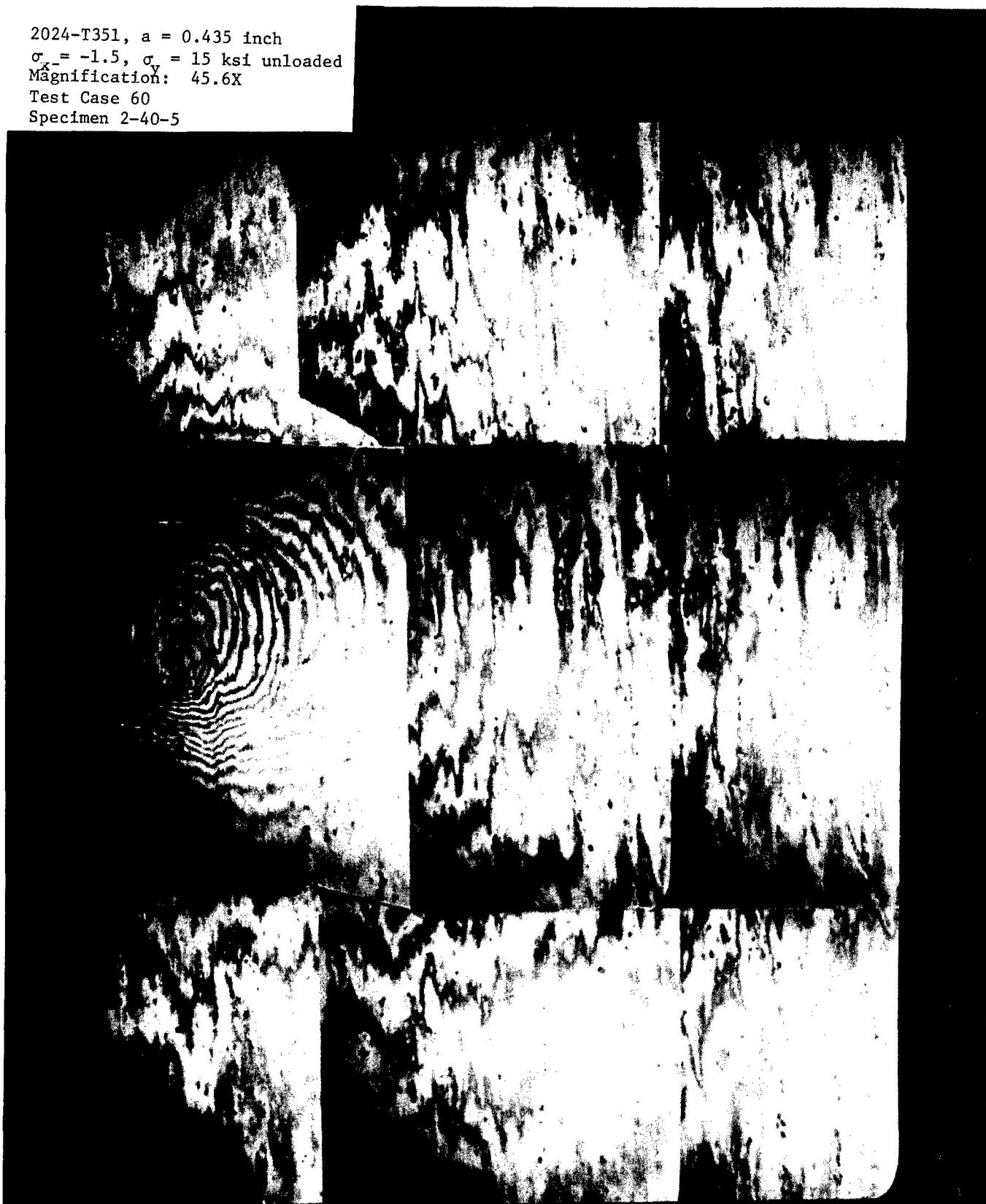


Figure 84. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.435$ inch
 $\sigma_x = -1.5$, $\sigma_y = 15$ ksi at load
Magnification: 40.6X
Test Case 60
Specimen 2-40-6

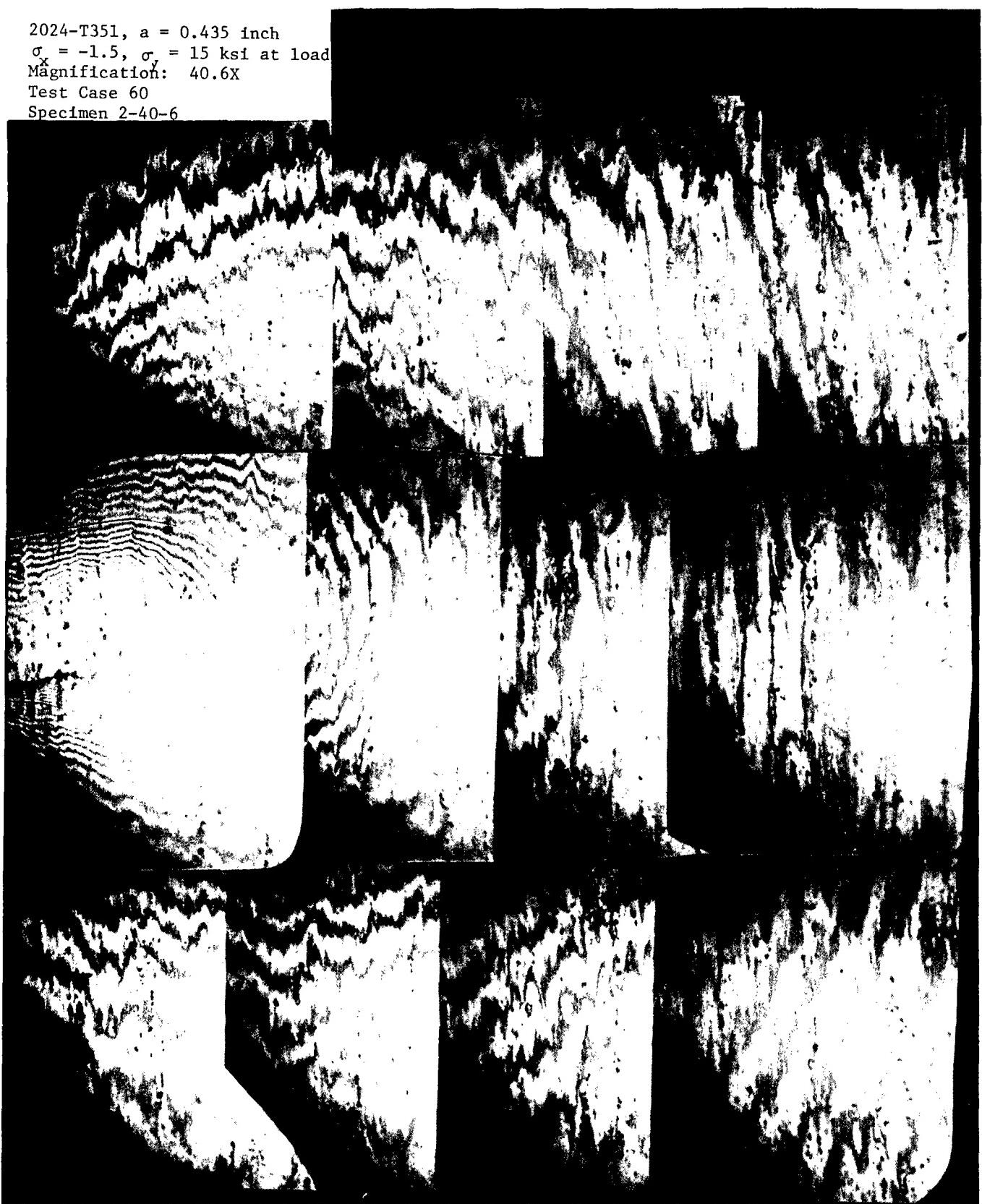


Figure 85. Interferometry Photograph of a Loaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.15$ inch
 $\sigma_x = -1.25$, $\sigma_y = 25$ ksi unloaded
Magnification 46.0X
Test Case 66
Specimen 2-28-1



Figure 86. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 1.15$ inch
 $\sigma_x = -1.25$, $\sigma_y = 25$ ksi at load
Magnification: 42.5X
Test Case 66
Specimen 2-28-2

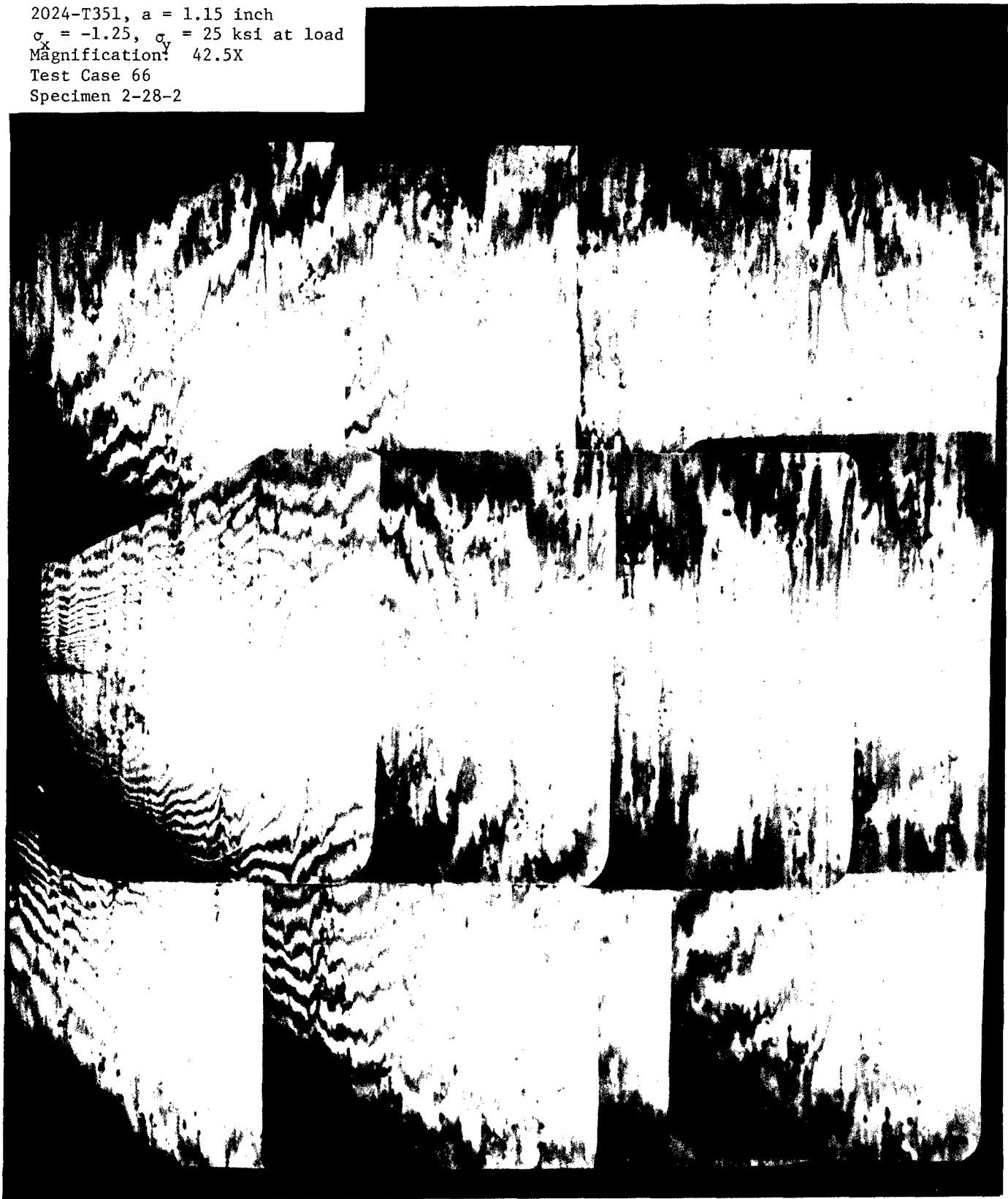


Figure 87. Interferometry Photograph of a Loaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.305$ inch
 $\sigma = -1.25$, $\sigma = 25$ ksi unloaded
Magnification: 46.4X
Test Case 66
Specimen 2-28-3.1

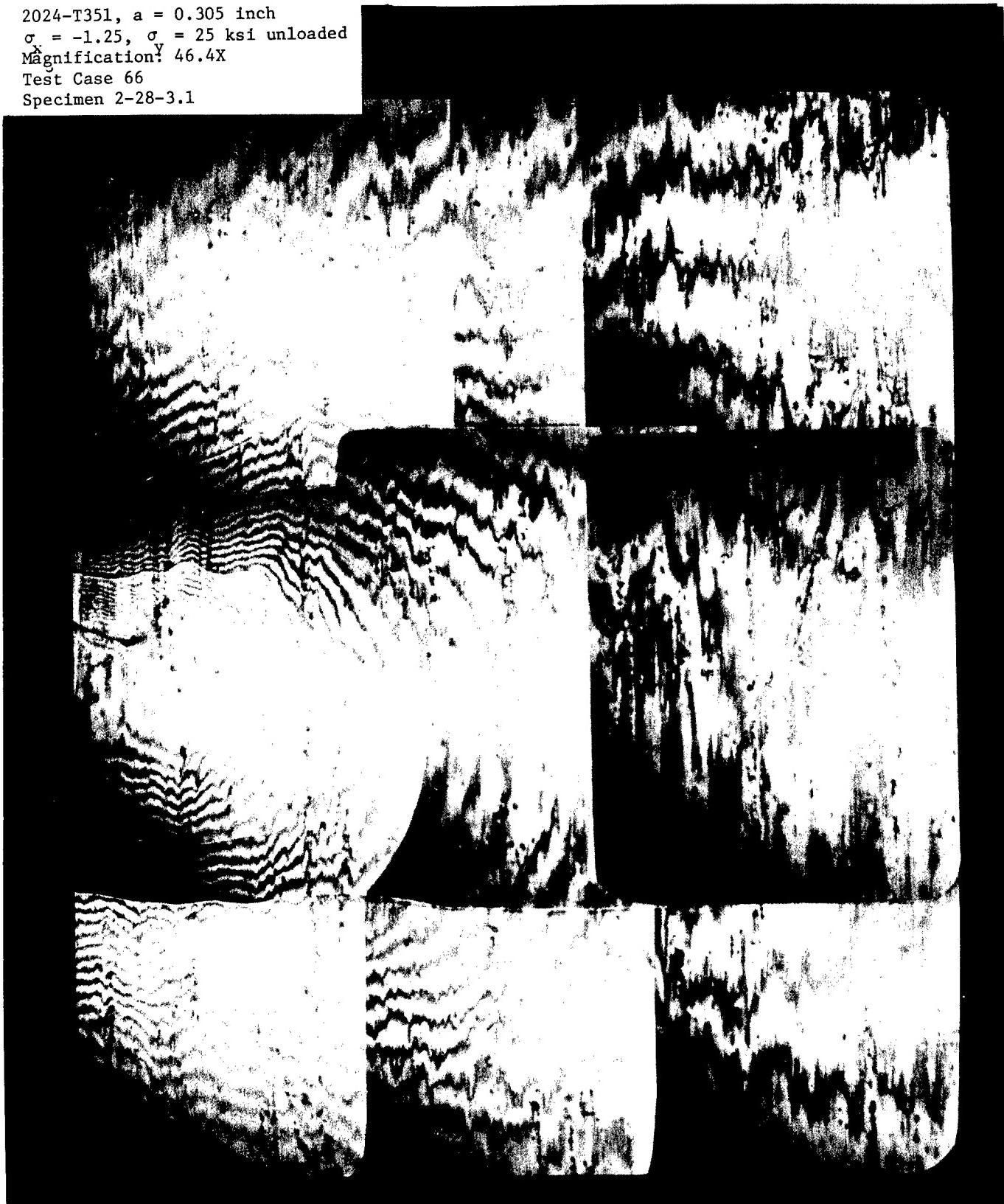


Figure 88. Interferometry Photograph of an Unloaded Crack in a 2024-T315 Specimen

2024-T351, $a = 0.305$ inch
 $\sigma_x = -1.25$, $\sigma_y = 25$ ksi unloaded
Magnification: 43.6X
Test Case 66
Specimen 2-28-3.2

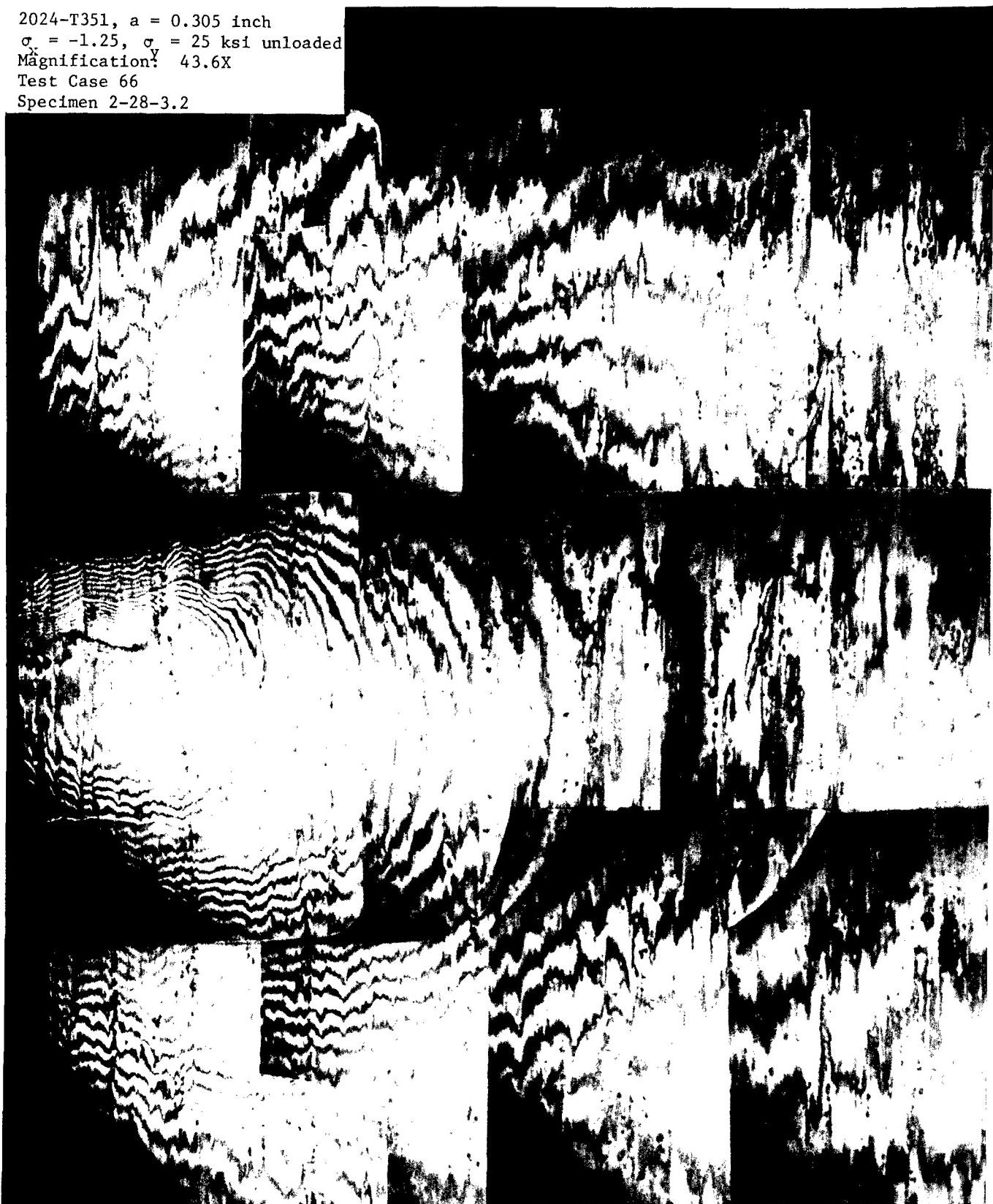


Figure 89. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.305$ inch
 $\sigma_x = -1.25$, $\sigma_y = 25$ ksi at load
Magnification: 29.7X
Test Case 66
Specimen 2-28-4

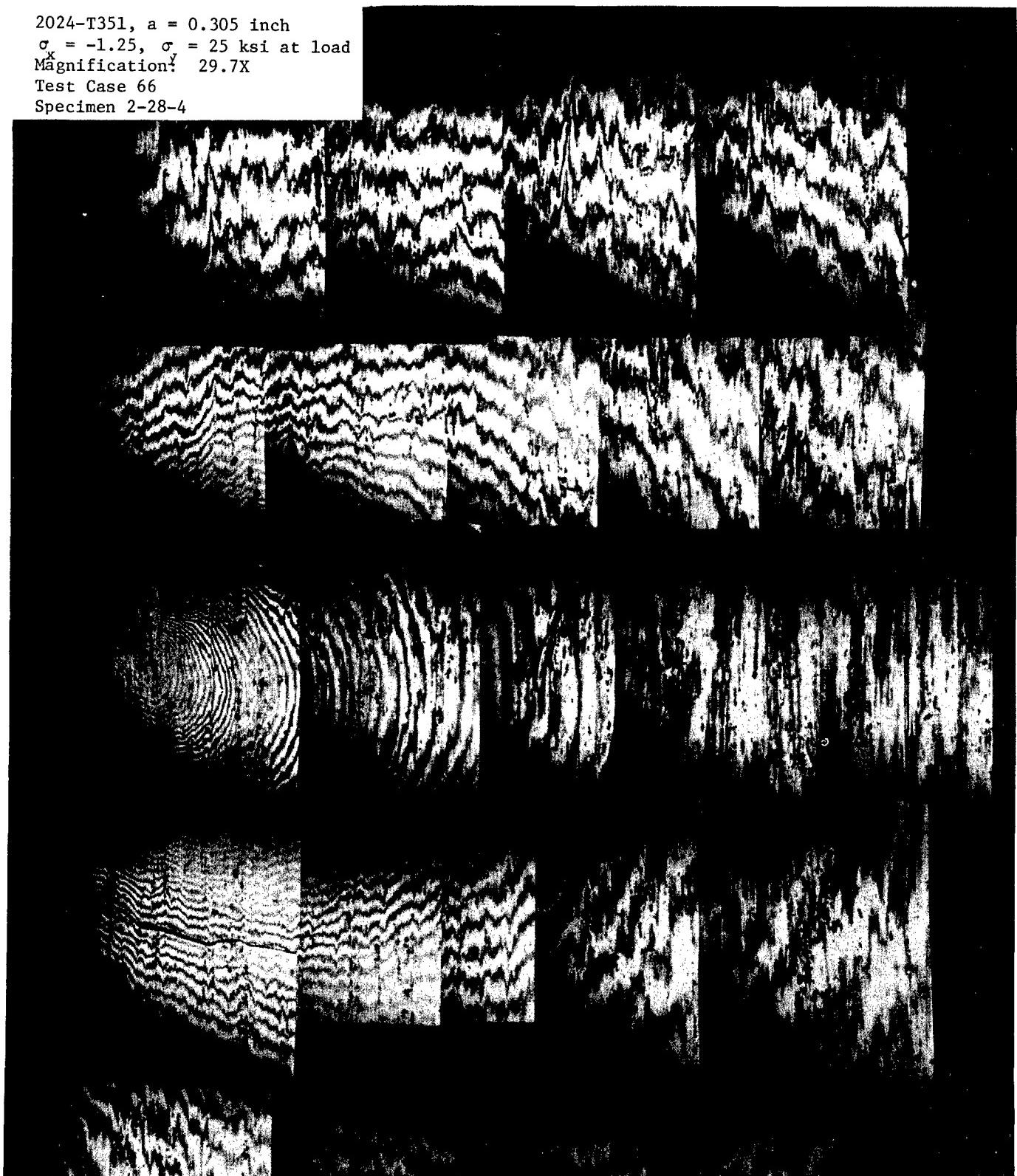


Figure 90. Interferometry Photograph of a Loaded Crack in a 2024-T351 Specimen

7075-T7351, $a = 0.25$ inch
 $\sigma_x = 0$, $\sigma_y = 12$ ksi unloaded
Mag: 91.5X
test case 99
Specimen - 7-114-1

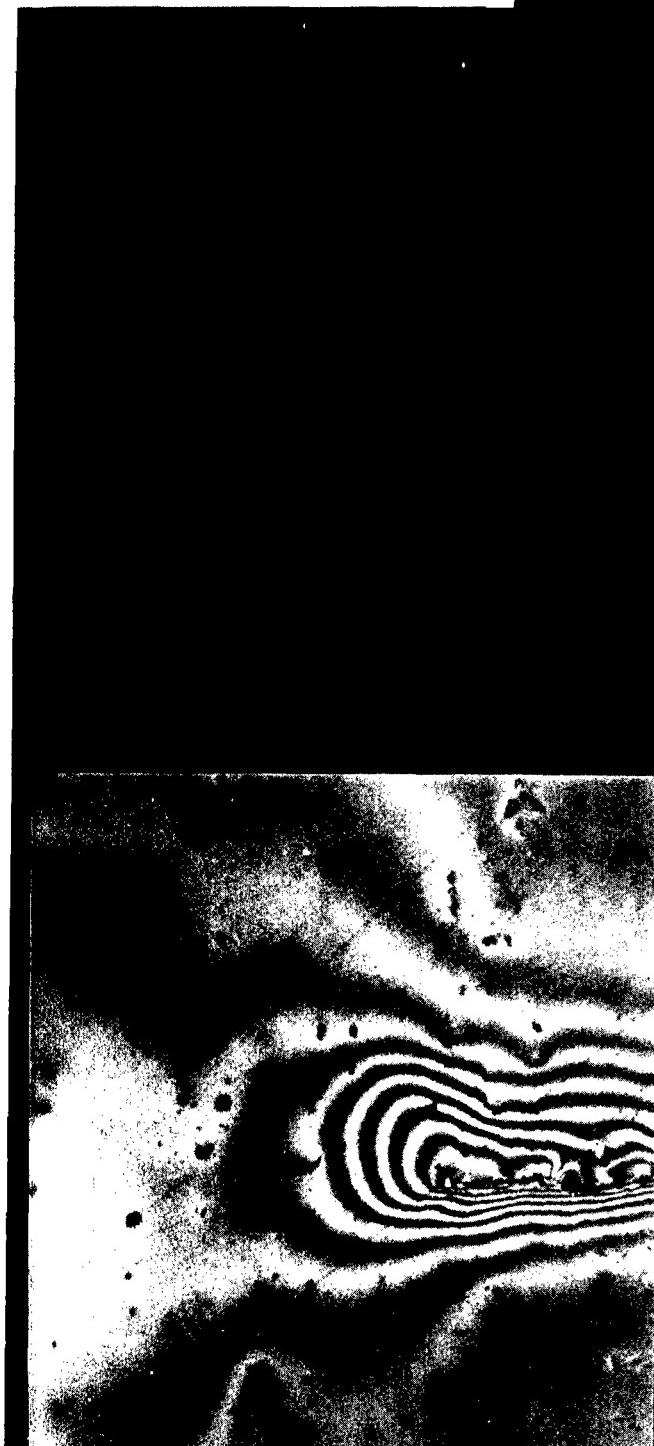


Figure 91. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T6351, $a = 0.25$ inch
 $\sigma_x = 0$, $\sigma_y = 24$ ksi overloaded
Magnification: 67.3X
T.C. 99
Specimen - 7-114-2

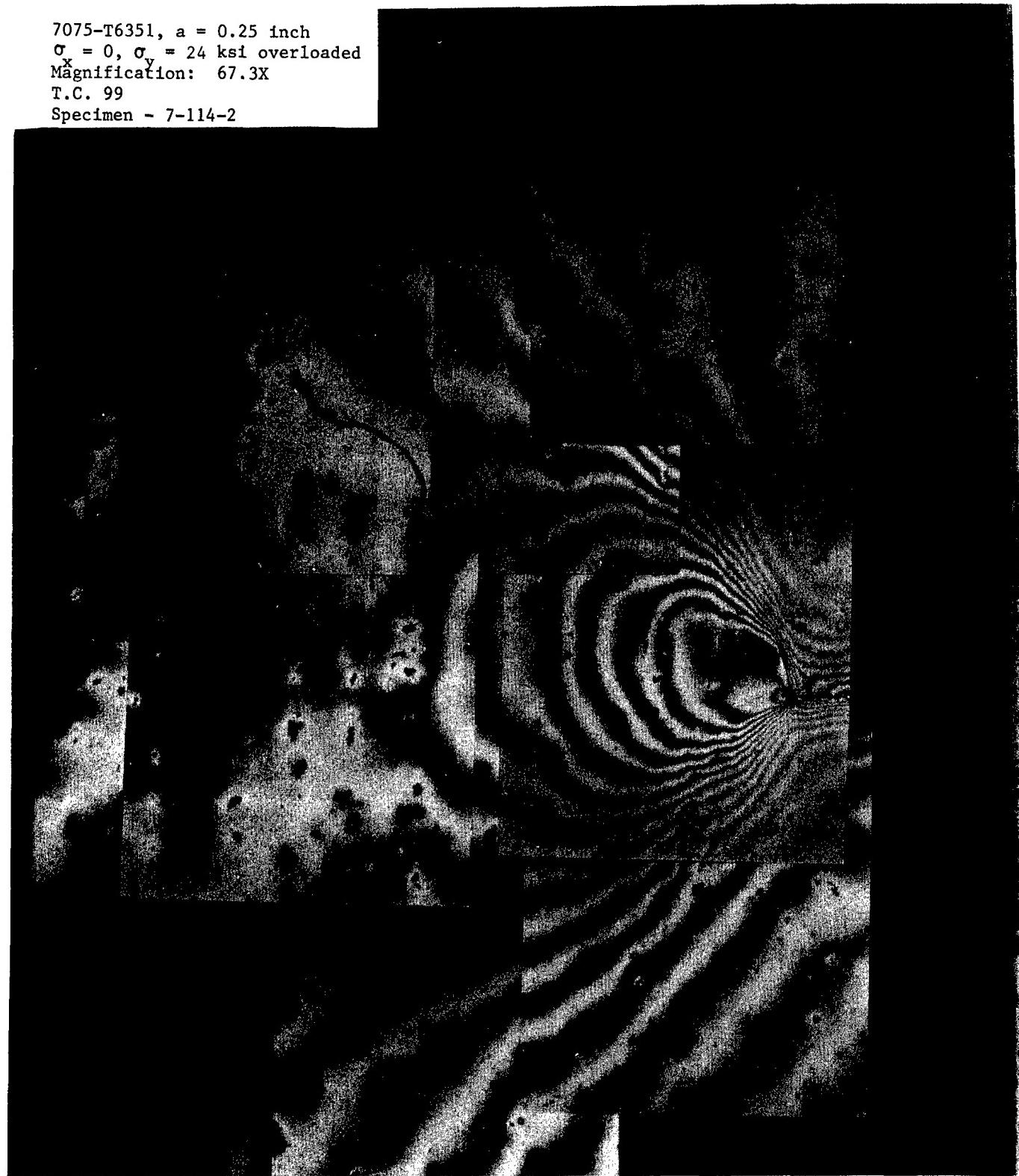


Figure 92. Interferometry Photograph of a Crack Unloaded from a Single Overload in a 7075-T7351 Specimen

7075-T7351, $a = 0.50$ inch
 $\sigma_x = 0$, $\sigma_y = 12$ ksi unloaded
Magnification: 73.0X
Test case 99
Specimen - 7-114-3



Figure 93. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.50$ inch
 $\sigma_x = 0$, $\sigma_y = 24$ ksi overloaded
Magnification: 22.6X
Test case 99
Specimen - 7-114-4

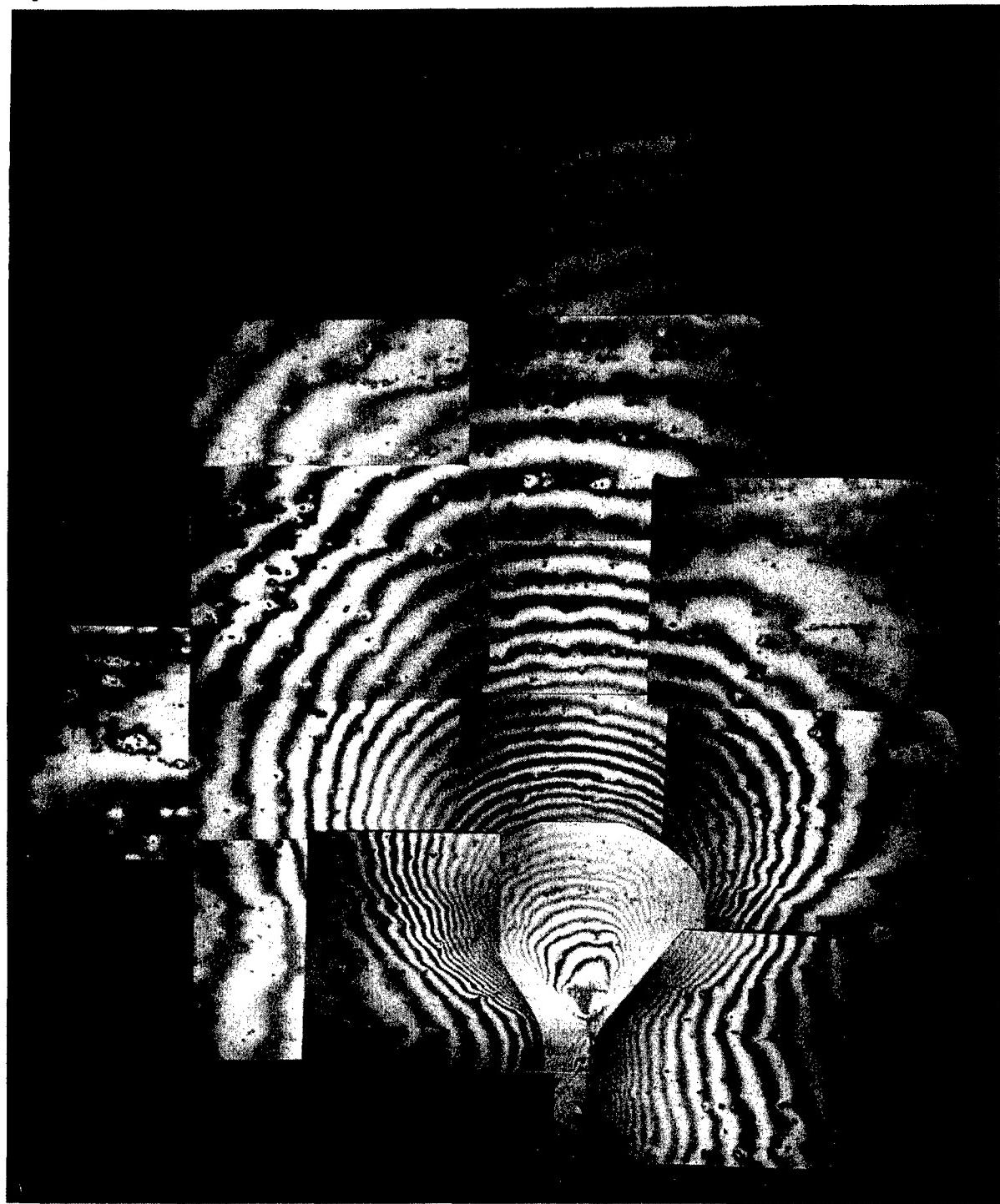


Figure 94. Interferometry Photograph of a Crack Unloaded from a Single Overload in a 7075-T7351 Specimen

7075-T7351, $a = 1.005$ inch
 $\sigma_x = 0$, $\sigma_y = 12$ ksi unloaded
Magnification: 21.6X
Test case 99
Specimen 7-114-5



Figure 95. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 1.005$ inch
 $\sigma_x = 0$, $\sigma_y = 24$ ksi overloaded
Magnification: 22.9X
Test case 99
Specimen 7-114-6

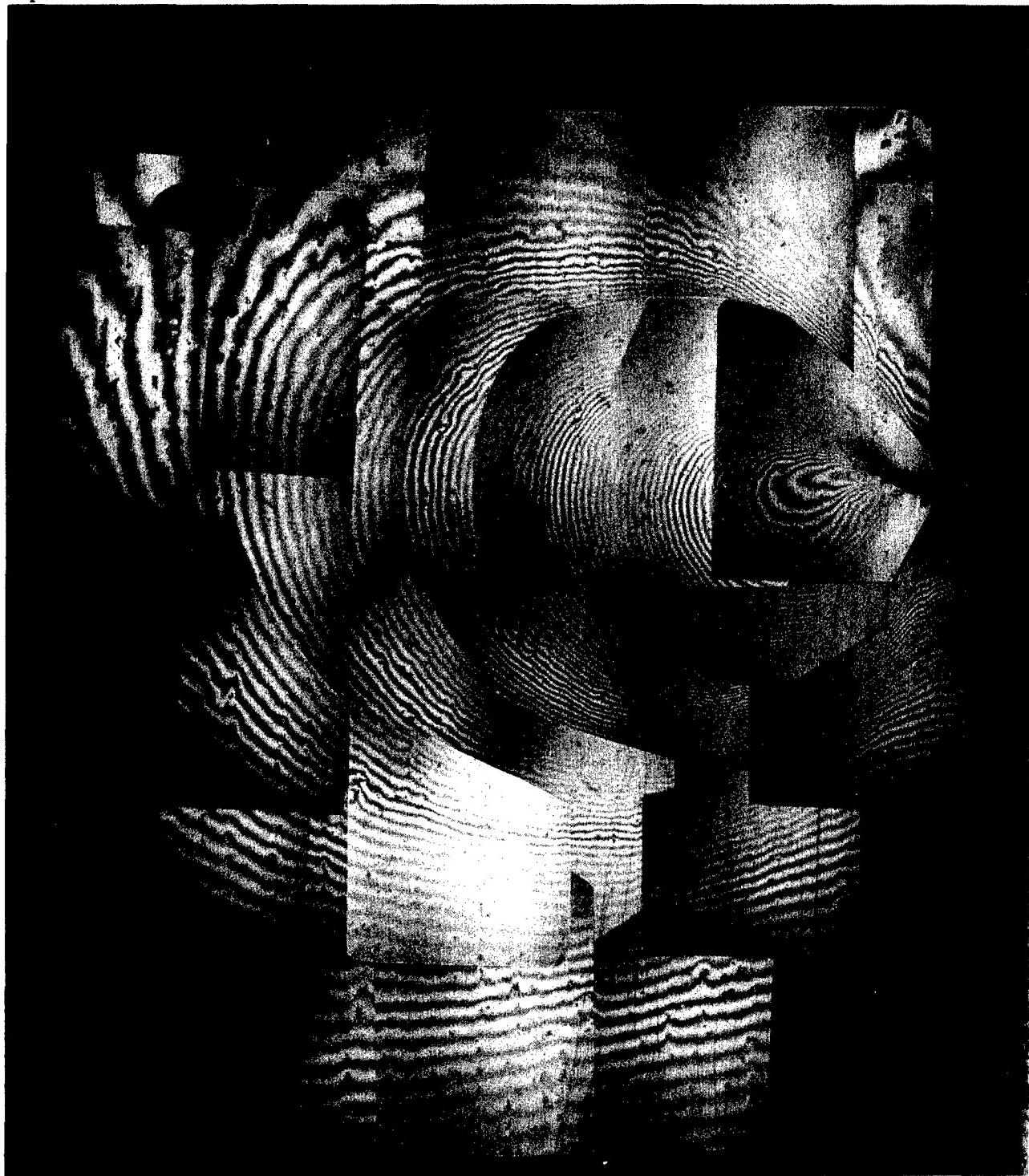


Figure 96. Interferometry Photograph of a Crack Unloaded from a Single-Overload in a 7075-T7351 Specimen

7075-T7351, $a = 0.265$ inch
 $\sigma_x = 6$, $\sigma_y = 12$ ksi unloaded
Magnification: 74.5X
Test Case 103
Specimen 7-25-1

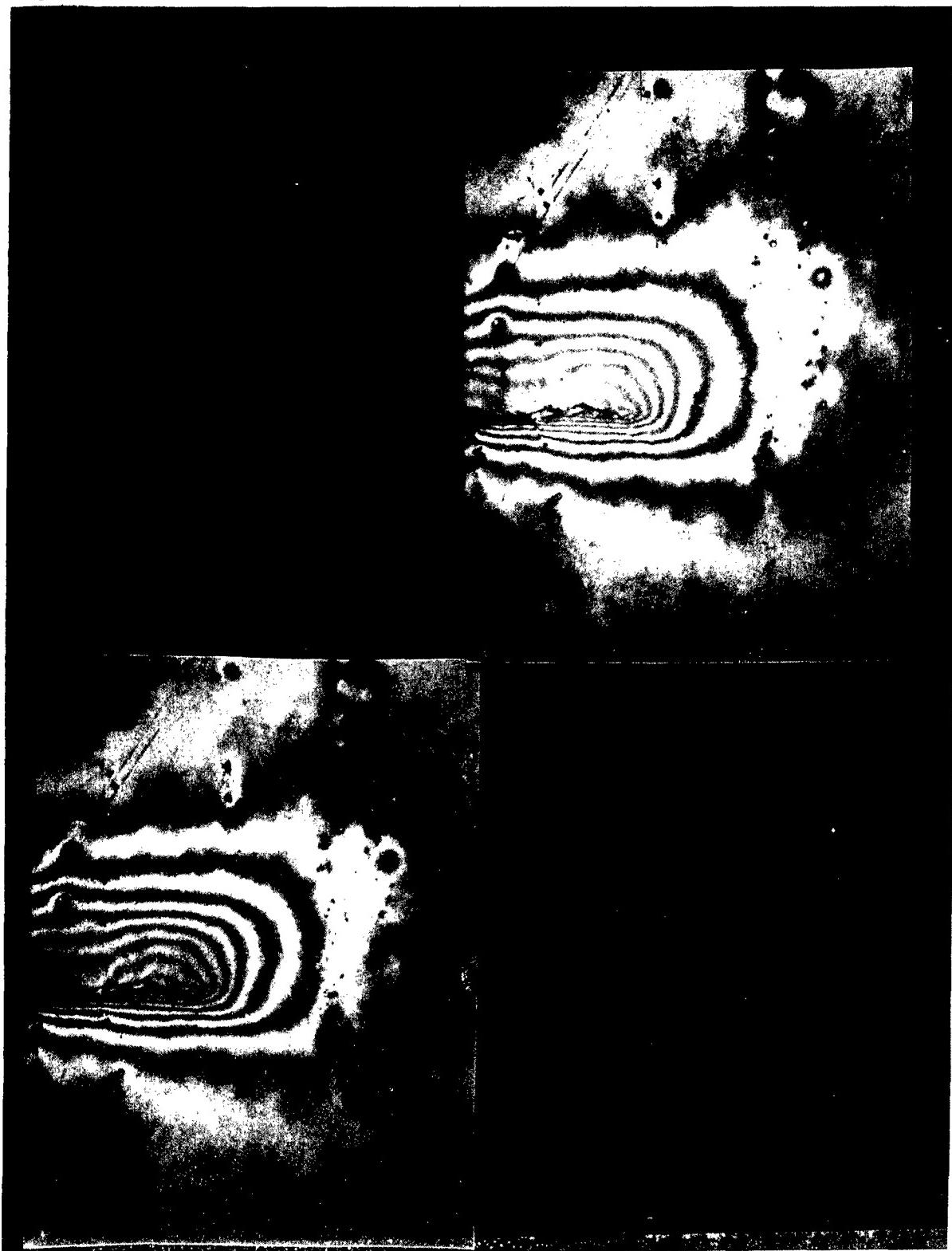


Figure 97. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.265$ inch
 $\sigma_x = 12$, $\sigma_y = 24$ ksi overloaded
Magnification: 70.6X
Test Case 103
Specimen - 7-25-2.1

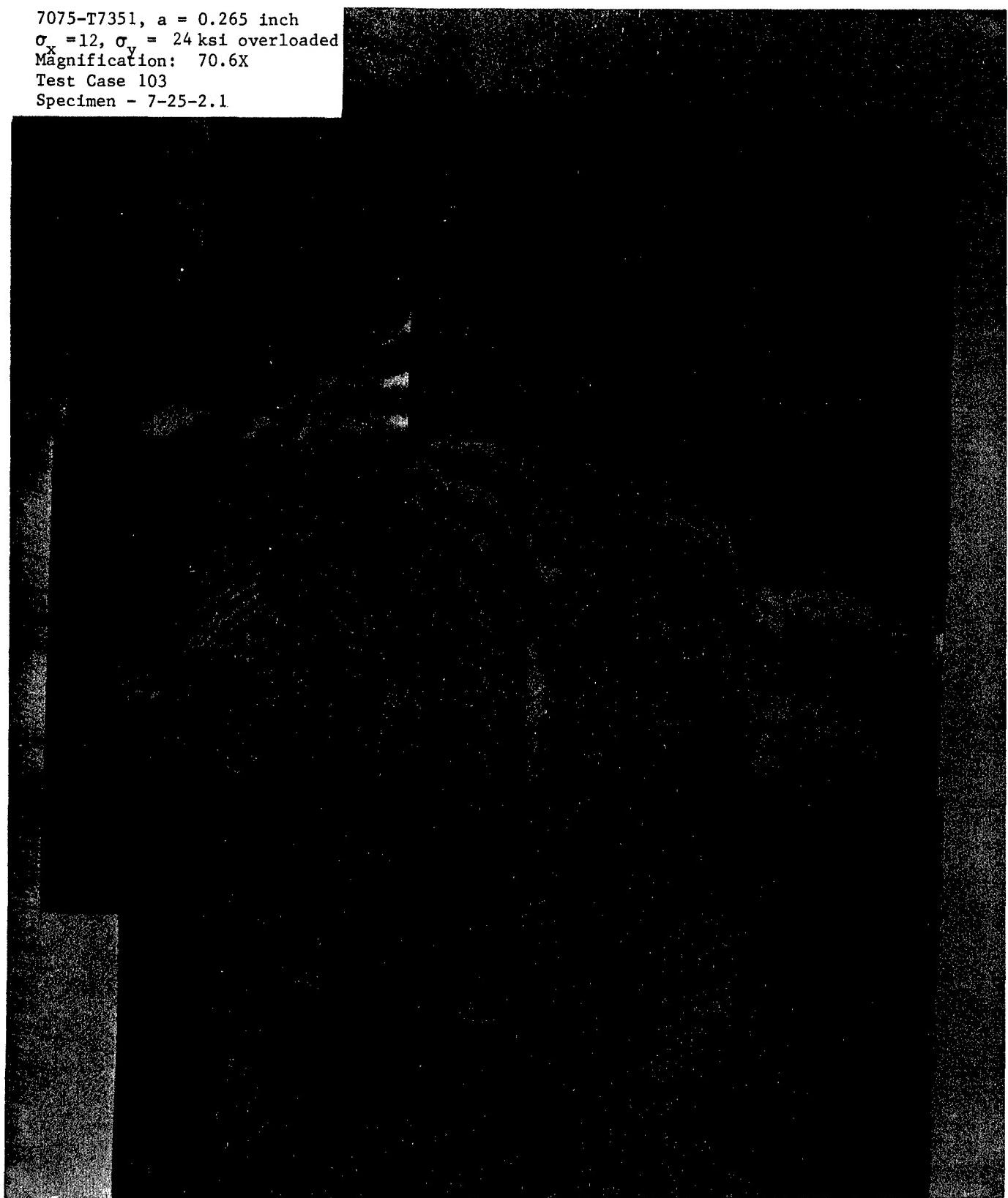


Figure 98. Interferometry Photograph of a Crack Unloaded from a Single Overload in a 7075-T7351 Specimen

7075-T7351, $a = 0.265$ inch
 $\sigma_x = 12$, $\sigma_y = 24$ ksi overloaded
Magnification: 77.4X
Test case 103
Specimen - 7-25-2.2



Figure 99. Interferometry Photograph of a Crack Unloaded from a Single Overload in a 7075-T7351 Specimen



7075-T7351, $a = 0.515$ inch
 $\sigma_x = 6$, $\sigma_y = 12$ ksi unloaded
Magnification: 70.6X
Test Case 103
Specimen - 7-25-3

Figure 100. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.515$ inch
 $\sigma_x = 12$, $\sigma_y = 24$ ksi overloaded
Magnification: 24.7X
Test Case 103
Specimen - 7-25-4



Figure 101. Interferometry Photograph of a Crack Unloaded from a Single Overload in a 7075-T7351 Specimen

7075-T7351, $a = 1.015$ inch
 $\sigma_x = 6$, $\sigma_y = 12$ ksi unloaded
Magnification: 35.3X
Test Case 103
Specimen - 7-24-5



Figure 102. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 1.020$ inch
 $\sigma_x = 12$, $\sigma_y = 24$ ksi overloaded
Magnification: 23.0X
Test Case 103
Specimen 7-25-6

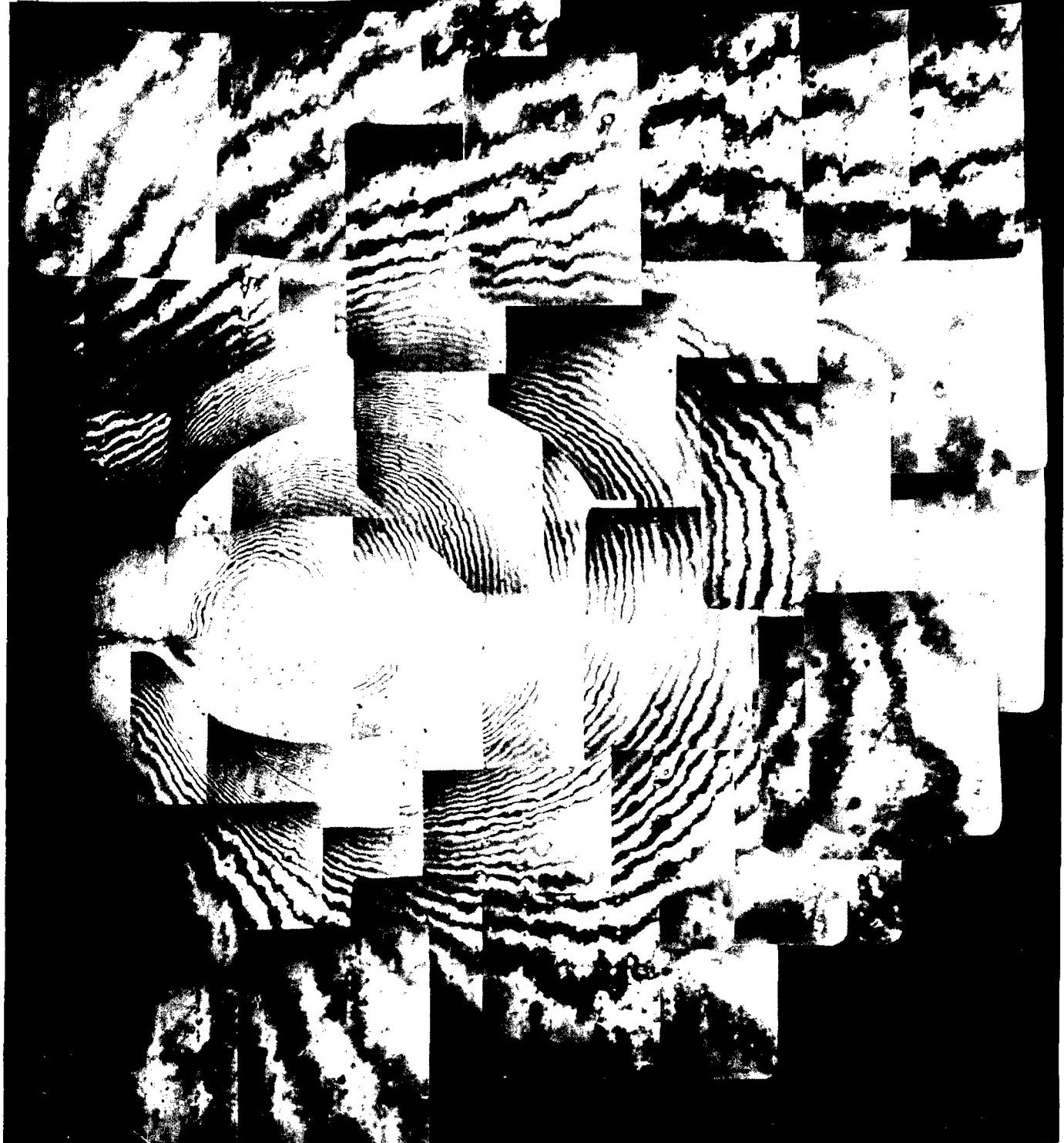


Figure 103. Interferometry Photograph of a Crack Unloaded from a Single Overload in a 7075-T7351 Specimen

7075-T7351, $a = 0.245$ inch
 $\sigma_x = -6.0$, $\sigma_y = 12$ ksi unloaded
Magnification: 46.5X
Test Case 105
Specimen 7-53-1

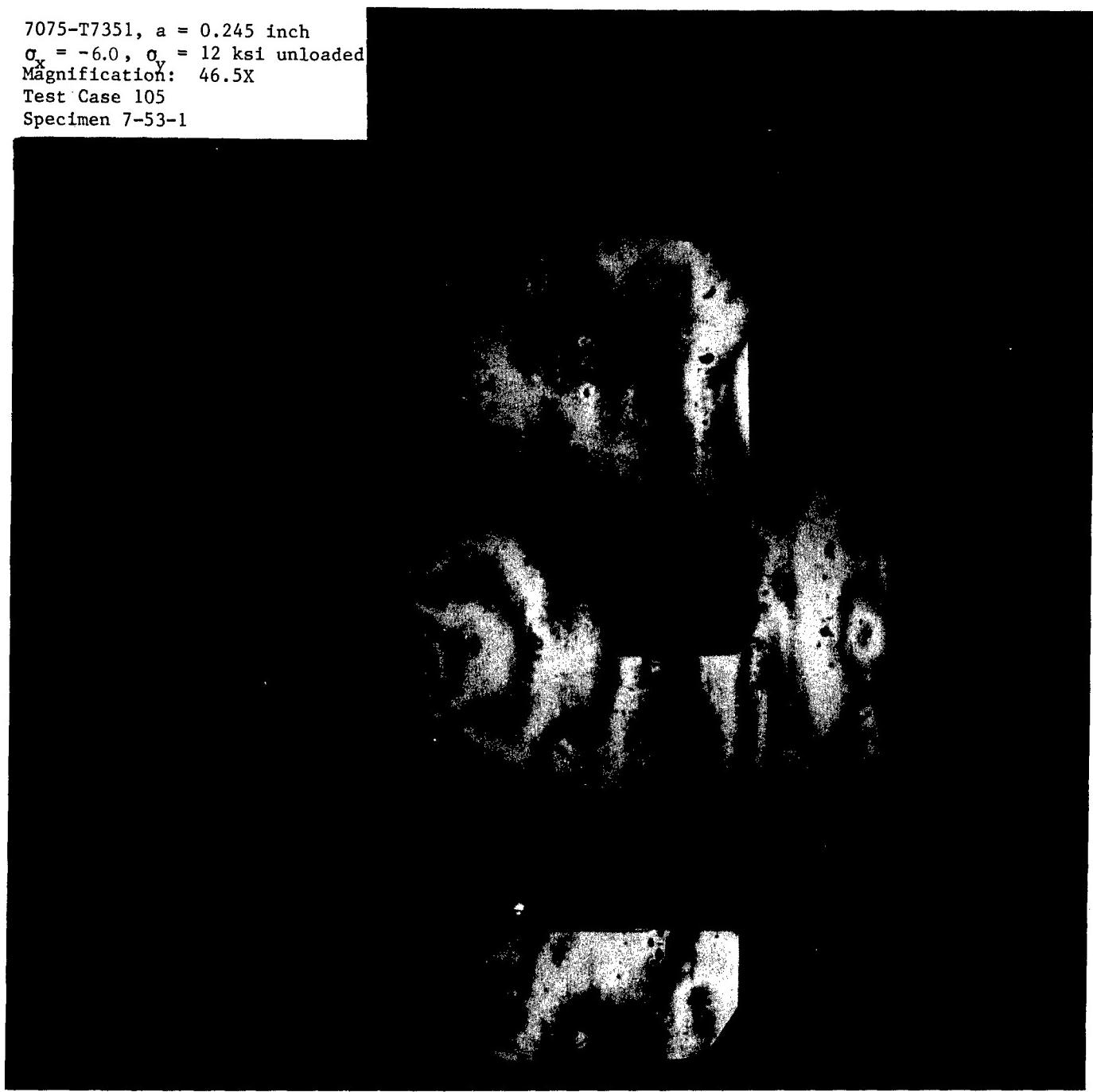


Figure 104. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.245$ inch
 $\sigma_x = -12$, $\sigma_y = 24$ ksi overloaded
Magnification: 48.9X
Test Case 105
Specimen 7-53-2.1



Figure 105. Interferometry Photograph of a Crack Unloaded from a Single Overload in a 7075-T7351 Specimen

7075-T7351, $a = 0.245$ inch
 $\sigma_x = -12$, $\sigma_y = 24$ ksi overloaded
Magnification: 46.7X
Test Case 105
Specimen 7-53-2.2

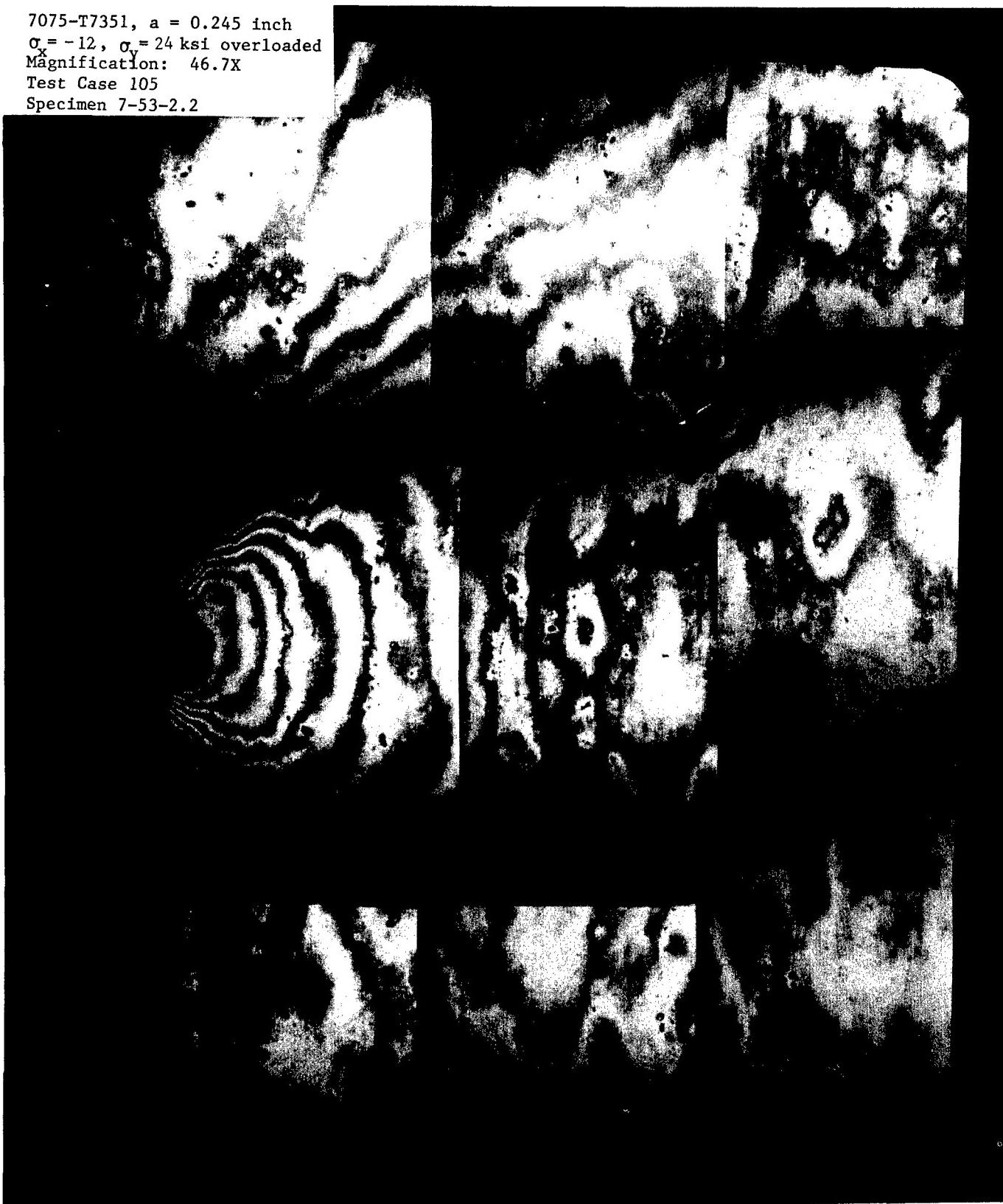


Figure 106. Interferometry Photograph of a Crack Unloaded from a Single Overload in a 7075-T7351 Specimen

7075-T7351, $a = 0.50$ inch
 $\sigma_x = -6.0$, $\sigma_y = 12$ ksi unloaded
Magnification: 47.6X
Test Case 105
Specimen 7-53-3.1

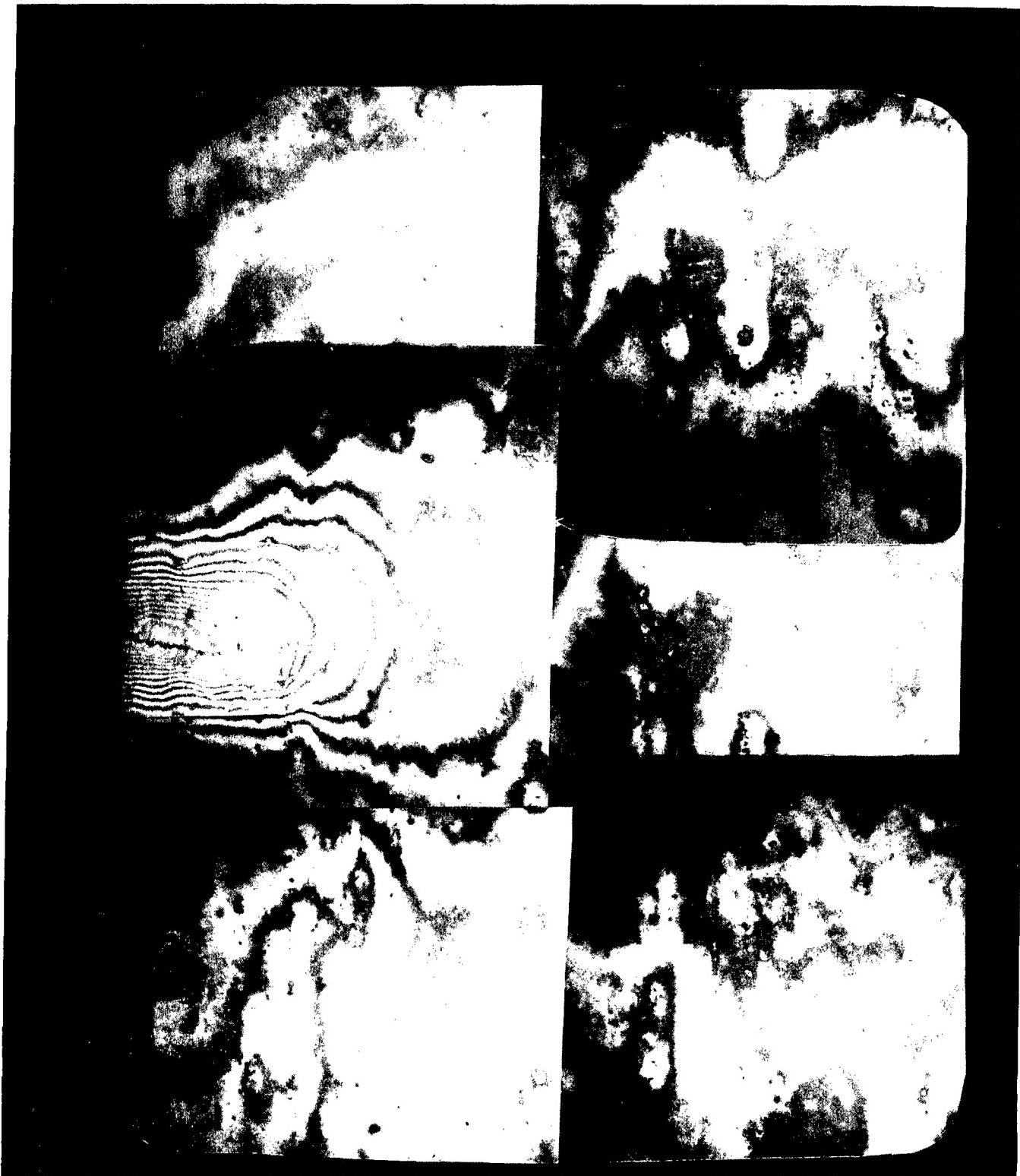


Figure 107. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.50$ inch
 $\sigma_x = -6.0$, $\sigma_y = 12$ ksi unloaded
Magnification: 47.6X
Test Case 105
Specimen 7-53-3.2



Figure 108. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.50$ inch
 $\sigma_x = -12$, $\sigma_y = 24$ ksi overloaded
Magnification: 44.5X
Test Case 105
Specimen 7-53-4

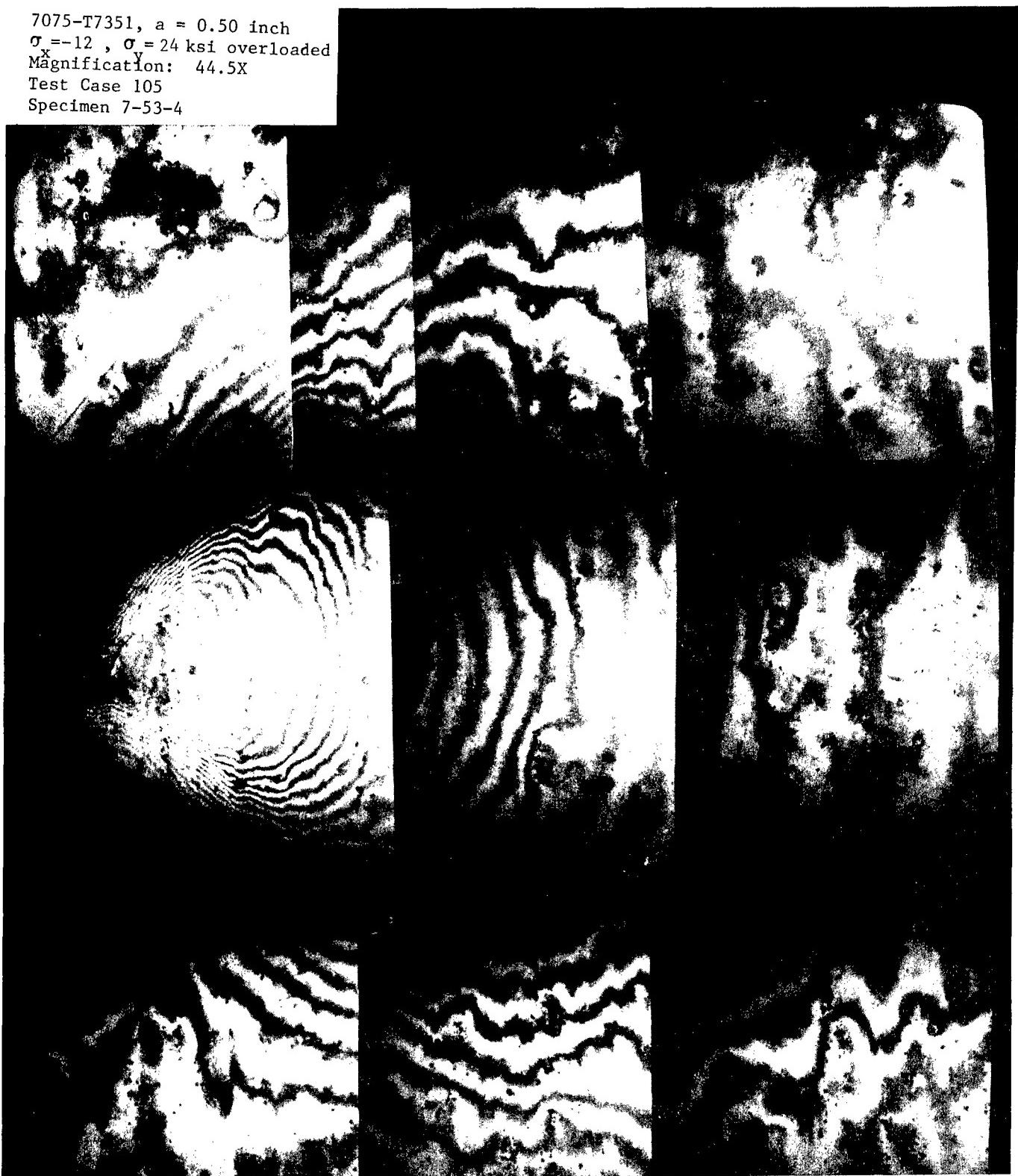


Figure 109. Interferometry Photograph of a Crack Unloaded from a Single Overload in a 7075-T7351 Specimen

7075-T7351, $a = 1.01$ inch
 $\sigma_x = -6.0$, $\sigma_y = 12$ ksi unloaded
Magnification: 47.5X
Test Case 105
Specimen 7-53-5



Figure 110. Interferometry Photograph of an Unloaded Crack in a
7075-T7351 Specimen

7075-T7351, $a = 1.01$ inch
 $\sigma_x = -12$, $\sigma_y = 24$ ksi overloaded
Magnification: 34.5X
Test Case 105
Specimen 7-53-6

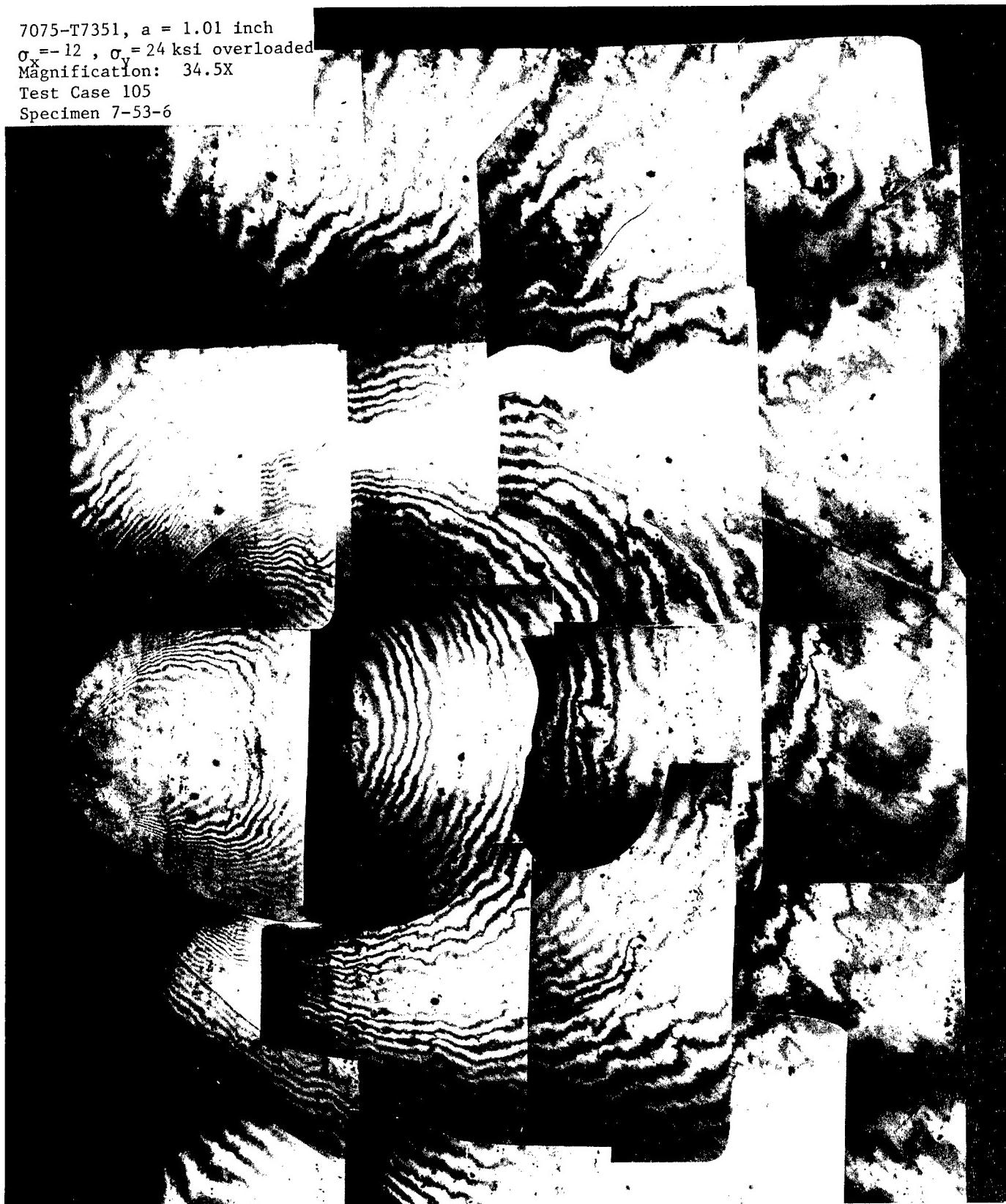


Figure 111. Interferometry Photograph of a Crack Unloaded from a Single Overload in a 7075-T7351 Specimen

2024-T351, $a = 0.26$ inch
 $\sigma_x = 0$, $\sigma_y = 10$ ksi unloaded
Magnification: 66.6X
Test Case 101
Specimen 2-24-1

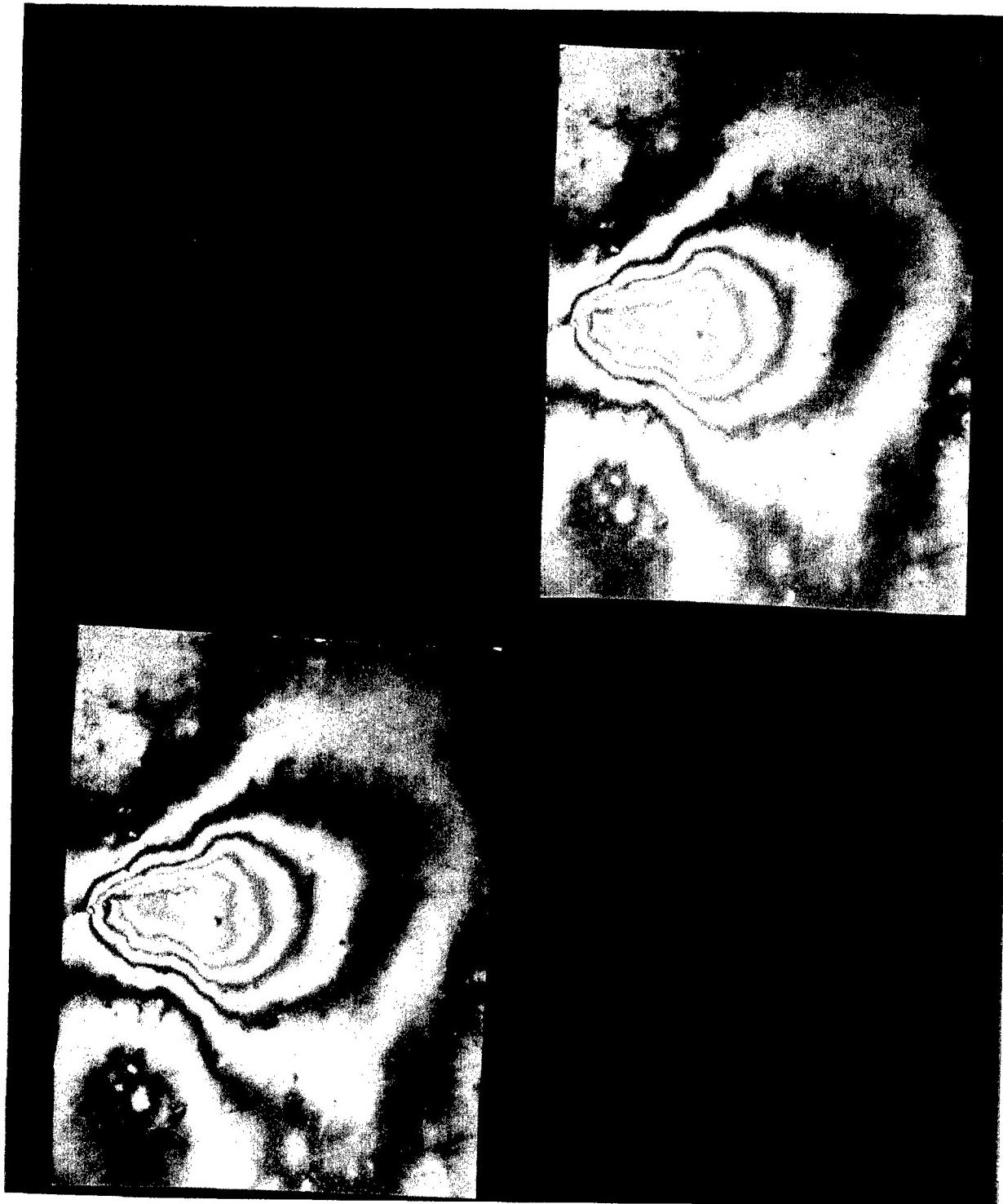


Figure 112. Interferometry Photograph of an Unloaded Crack
in a 2024-T351 Specimen

2024-T351, $a = 0.26$ inch
 $\sigma_x = 0$, $\sigma_y = 20$ ksi overloaded
Magnification: 70.3X
Test Case 101
Specimen 2-24-2



Figure 113. Interferometry Photograph of a Crack Unloaded from a Single Overload in a 2024-T351 Specimen

2024-T351, $a = 0.49$ inch
 $\sigma_x = 0$, $\sigma_y = 10$ ksi unloaded
Magnification: 35.9X
Test Case 101
8

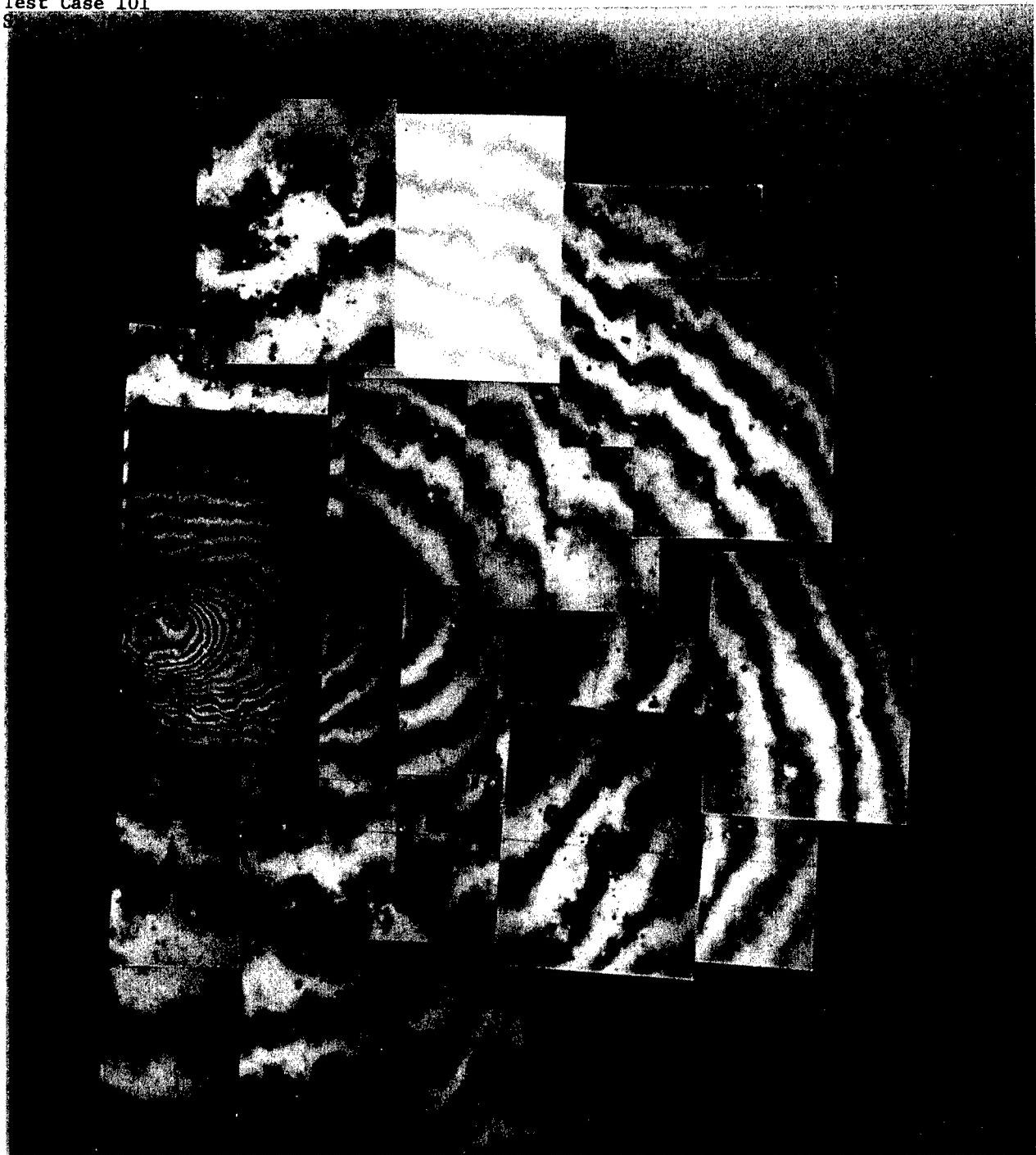


Figure 114. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.49$ inch
 $\sigma_x = 0$, $\sigma_y = 20$ ksi overloaded
Magnification: 23.3X
Test Case 101
Specimen 2-24-4

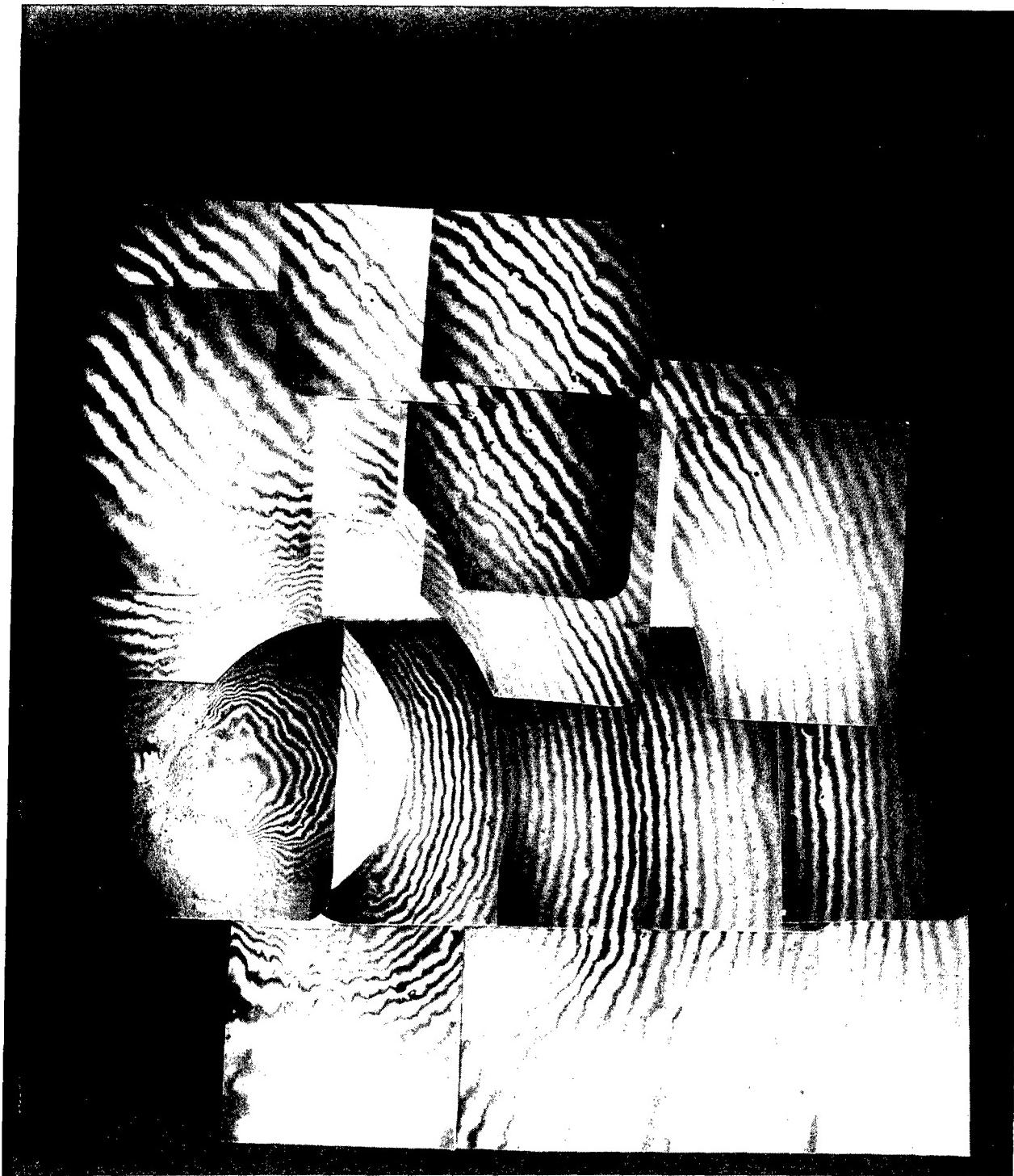


Figure 115. Interferometry Photograph of a Crack Unloaded from a Single Overload in a 2024-T351 Specimen

2024-T351, $a = 0.93$ inch
 $\sigma_x = 0$, $\sigma_y = 10$ ksi unloaded
Magnification: 22.5X
Test Case 101
Specimen 2-24-5



Figure 116. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.22$ inch
 $\sigma_x = 5$, $\sigma_y = 10$ ksi unloaded
Magnification: 74.4X
Test Case 108
Specimen 2-38-1

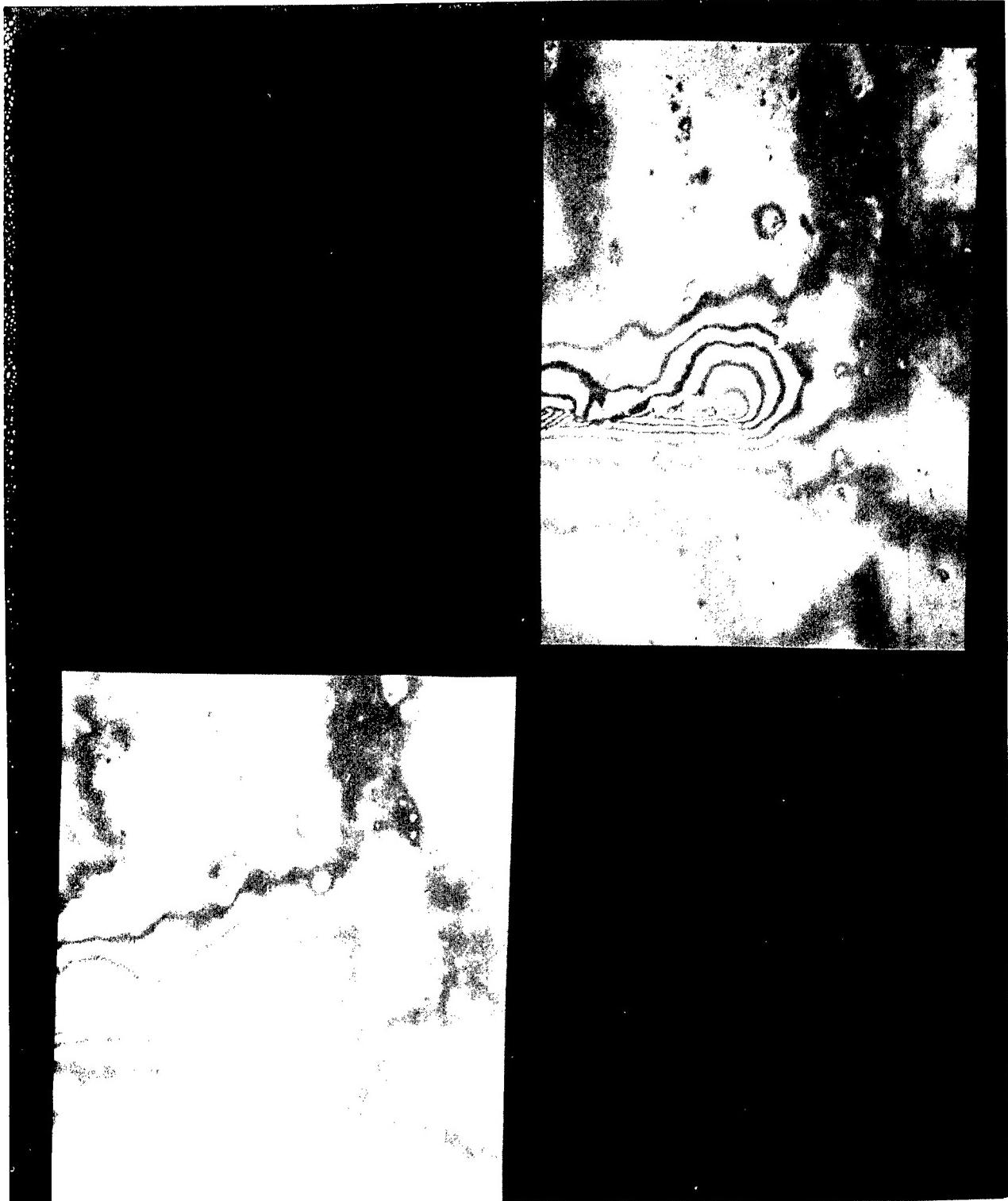


Figure 117. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.2225$ inch
 $c_x = 10$, $\sigma_y = 20$ ksi overloaded
Magnification 70.7X
Test Case 108
Specimen 2-38-2

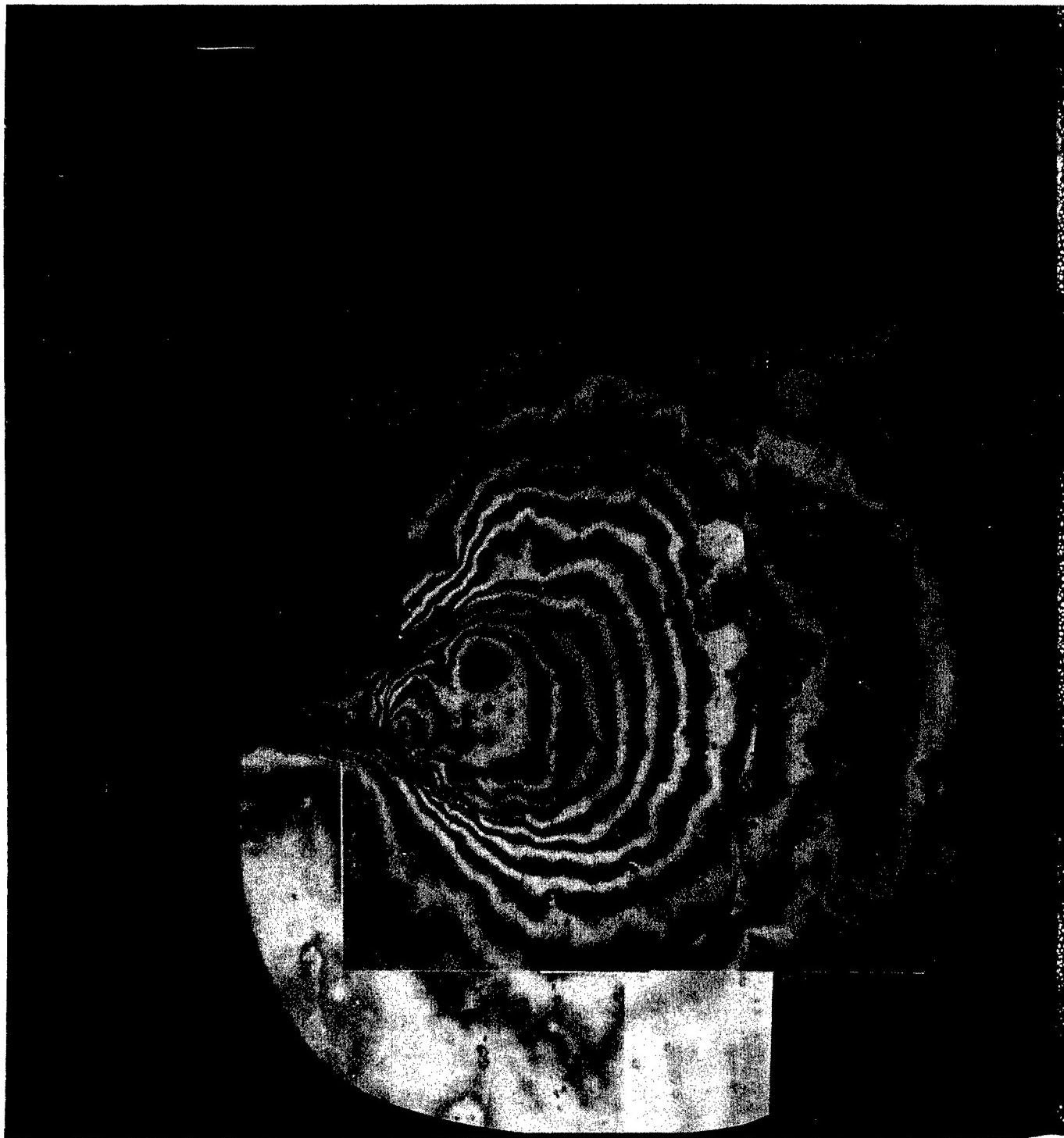


Figure 118. Interferometry Photograph of a Crack Unloaded from a Single Overload in a 2024-T351 Specimen

2024-T351, $a = 0.5$ inch
 $\sigma_x = 5$, $\sigma_y = 10$ ksi unloaded
Magnification: 74.0X
Test Case 108
Specimen 2-38-3

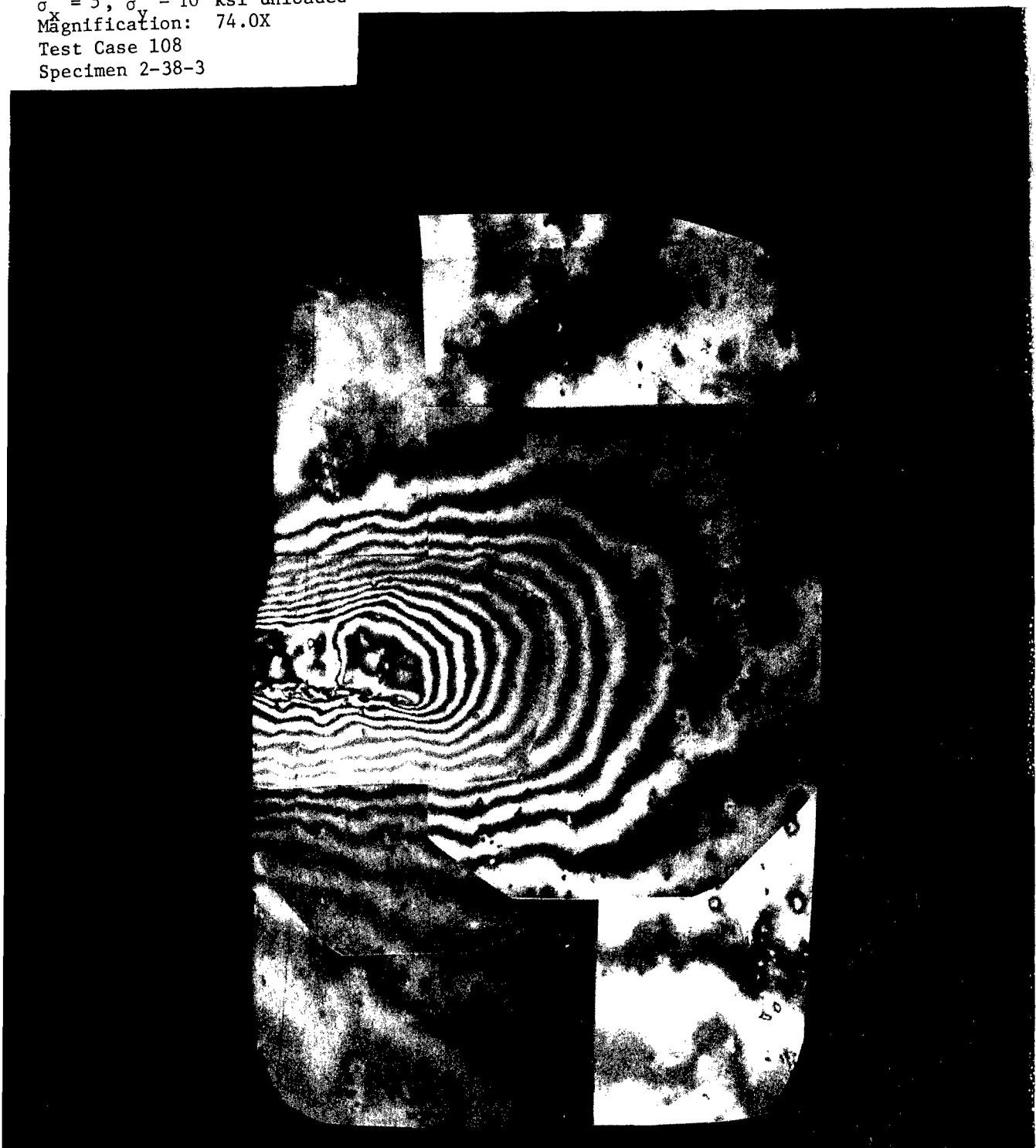


Figure 119. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.5$ inch
 $\sigma_x = 10$, $\sigma_y = 20$ ksi overloaded
Magnification: 45.5X
Test Case 108
Specimen 2-38-4

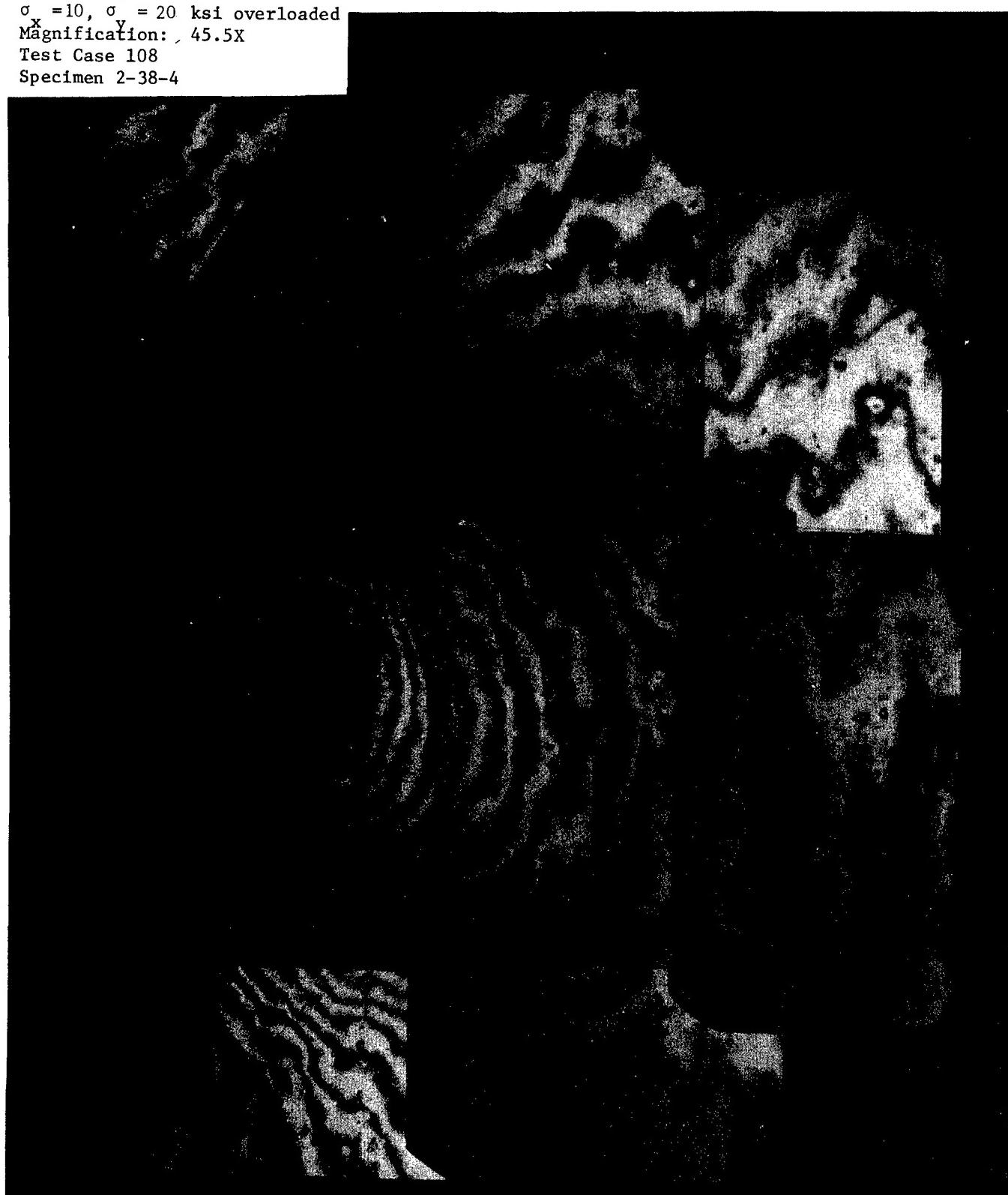


Figure 120. Interferometry Photograph of a Crack Unloaded from a Single Overload in a 2024-T351 Specimen

2024-T351, $a = 0.975$ inch
 $\sigma_x = 5$, $\sigma_y = 10$ ksi unloaded
Magnification: 44.3X
Test Case 108
Specimen 2-38-5

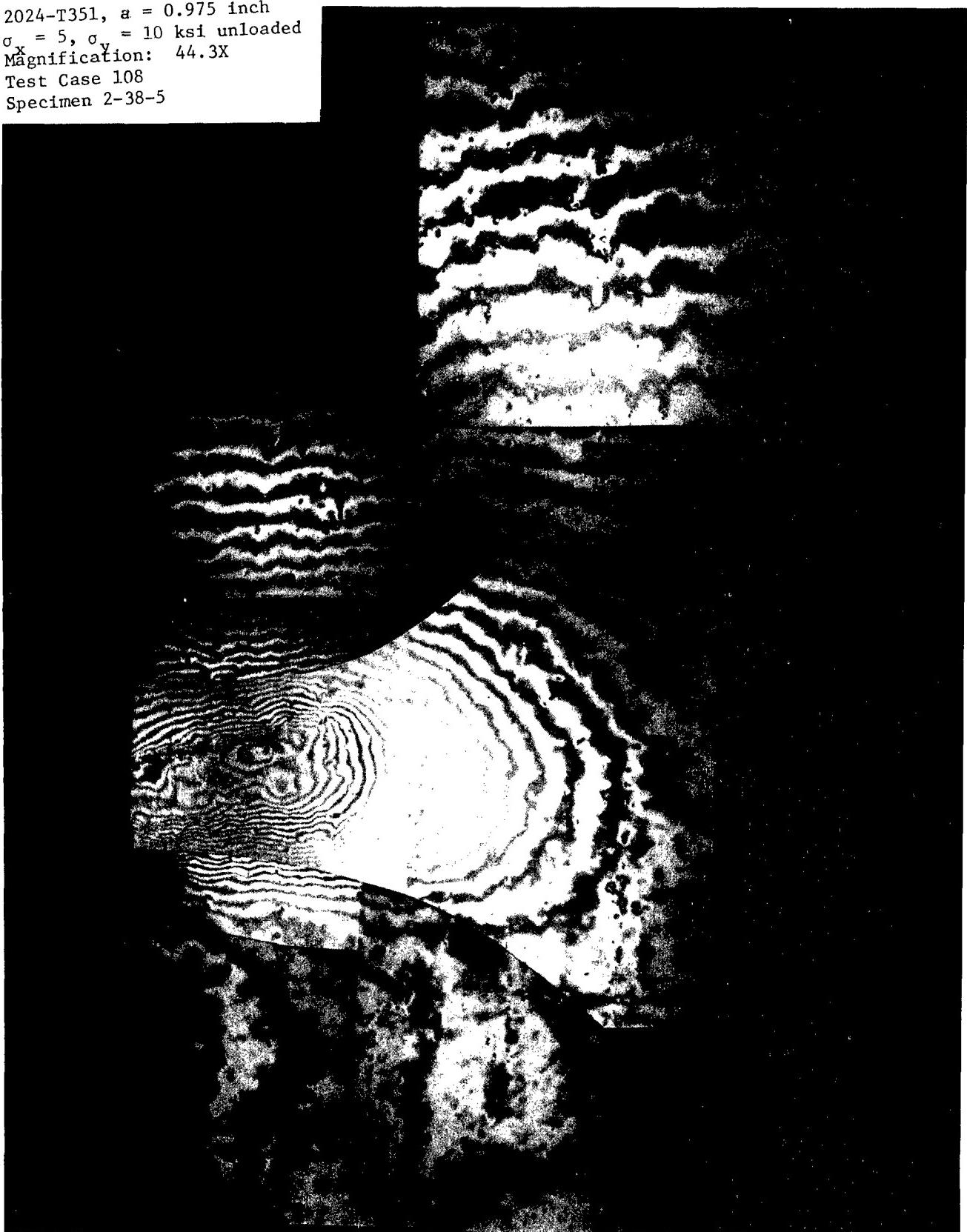


Figure 121. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.975$ inch
 $\sigma_x = 10$, $\sigma_y = 20$ ksi overloaded
Magnification: 22.8X
Test Case No. 108
Specimen 2-38-6

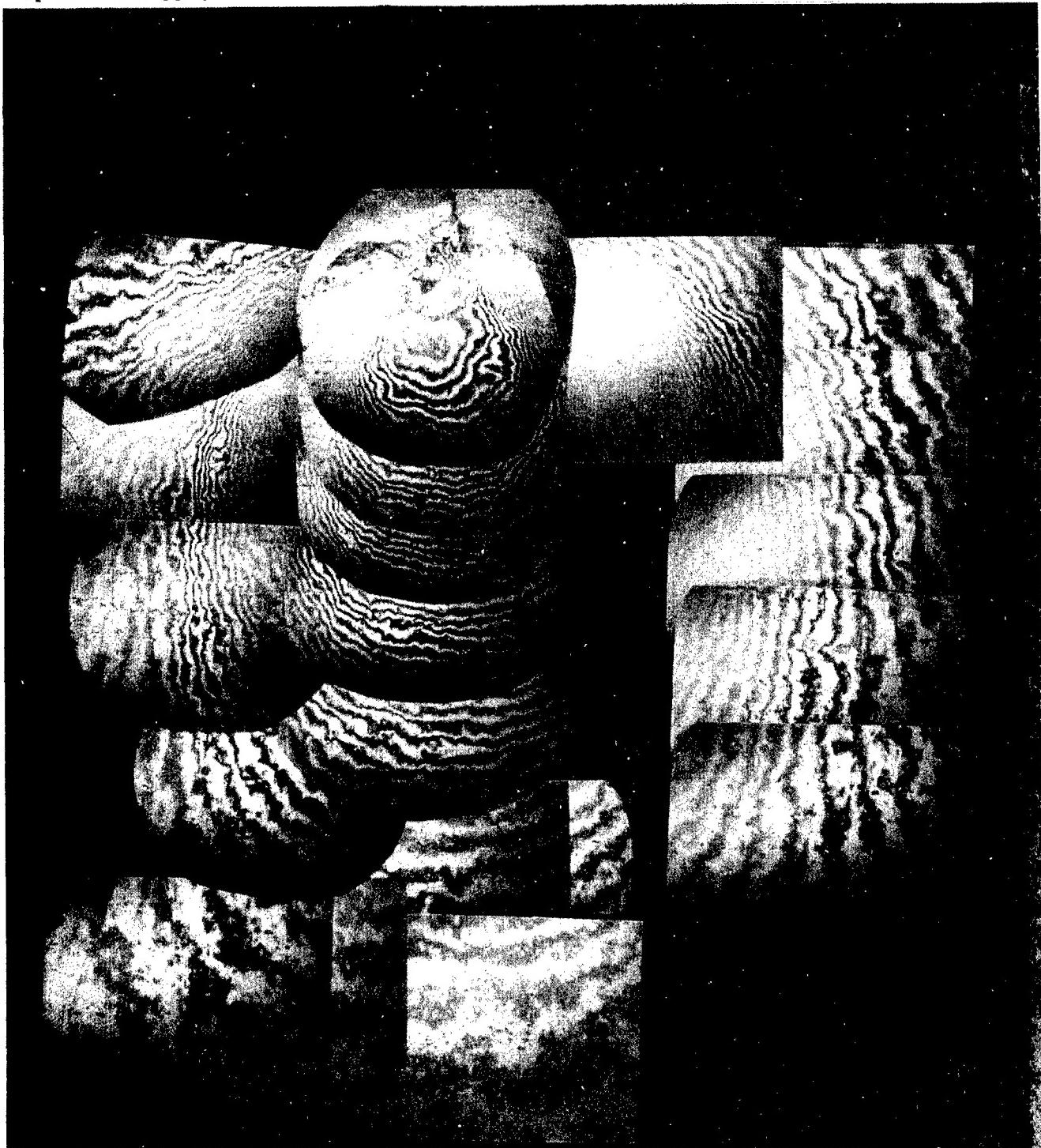


Figure 122. Interferometry Photograph of a Crack Unloaded from a Single Overload in a 2024-T351 Specimen

2024-T351, $a = 0.275$ inch
 $\sigma_x = -5.0$, $\sigma_y = 10$ ksi unloaded
Magnification: 43.6X
Test Case 110
Specimen 2-41-1

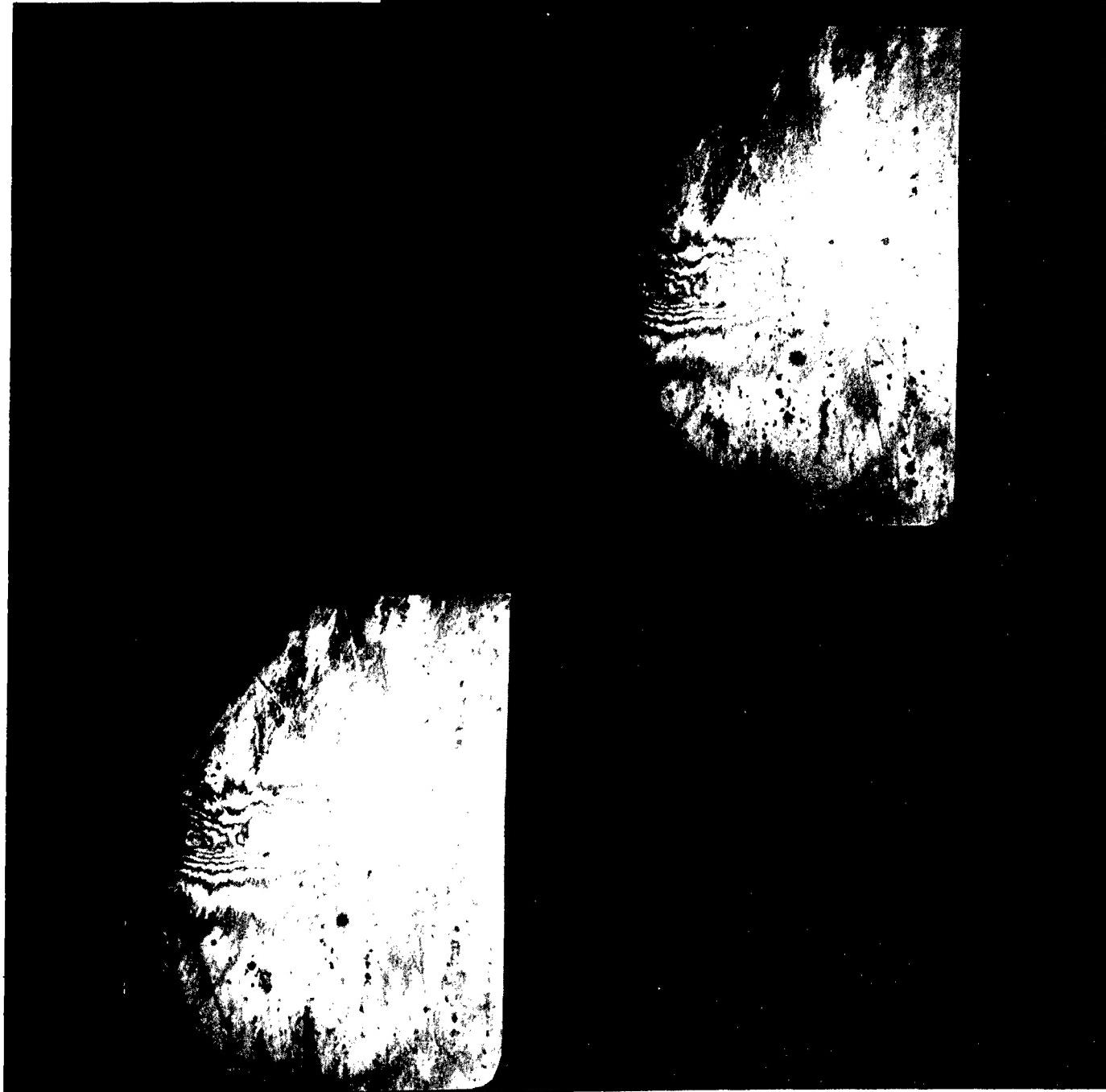


Figure 123. Interferometry Photograph of an Unloaded Crack
in a 2024-T351 Specimen

2024-T351, $a = 0.28$ inch
 $\sigma_x = -10$, $\sigma_y = 20$ ksi overloaded
Magnification: 46.3X
Test Case 110
Specimen 2.41-2.1

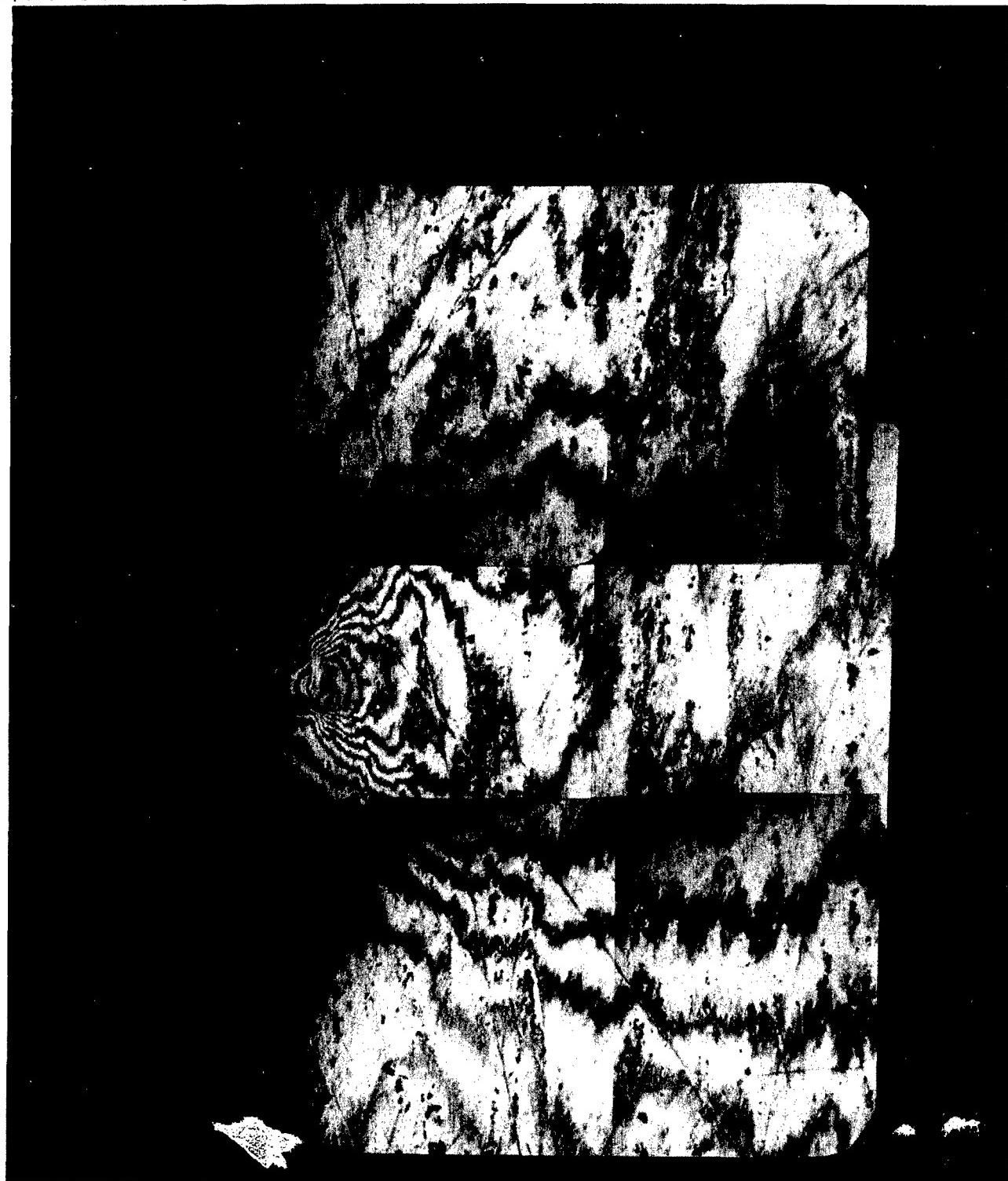


Figure 124. Interferometry Photograph of a Crack Unloaded from a Single Overload in a 2024-T351 Specimen

2024-T351, $a = 0.28$ inch
 $x\sigma = -10$, $y\sigma = 20$ ksi overloaded
Magnification: 45.9X
Test Case 110
Specimen 2-41-2.2



Figure 125. Interferometry Photograph of a Crack Unloaded from a Single Overload in a 2024-T351 Specimen

2024-T351, $a = 0.5$ inch
 $\sigma_x = -5.0$, $\sigma_y = 10$ ksi unloaded
Magnification: 46.3X
Test Case 110
Specimen 2-41-3

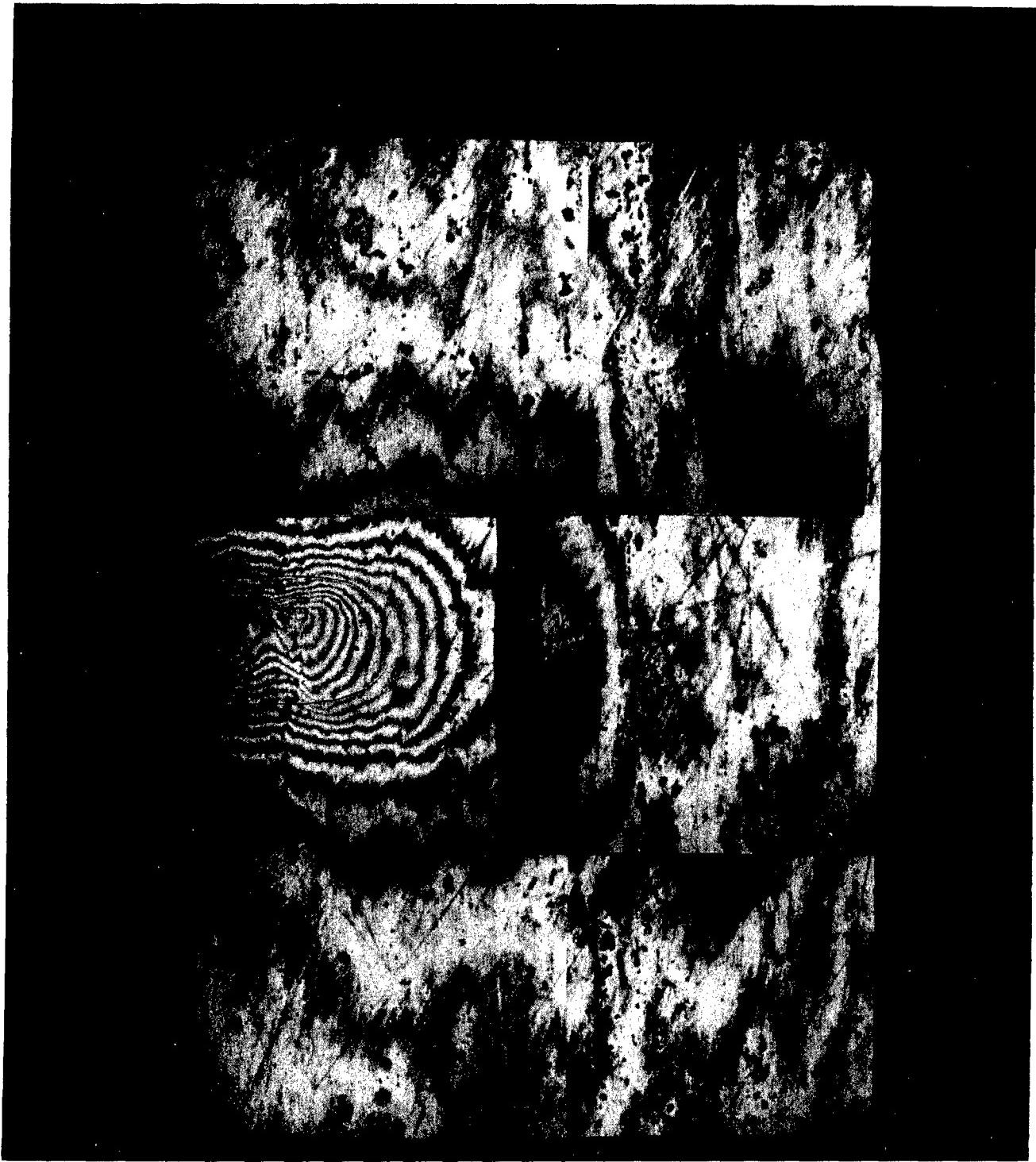


Figure 126. Interferometry Photograph of an Unloaded Crack
on a 2024-T351 Specimen

2024-T351, $a = 0.5$ inch
 $\sigma_x = -10$, $\sigma_y = 20$ ksi overloaded
Magnification: 40.7X
Test Case 110
Specimen 2-41-4

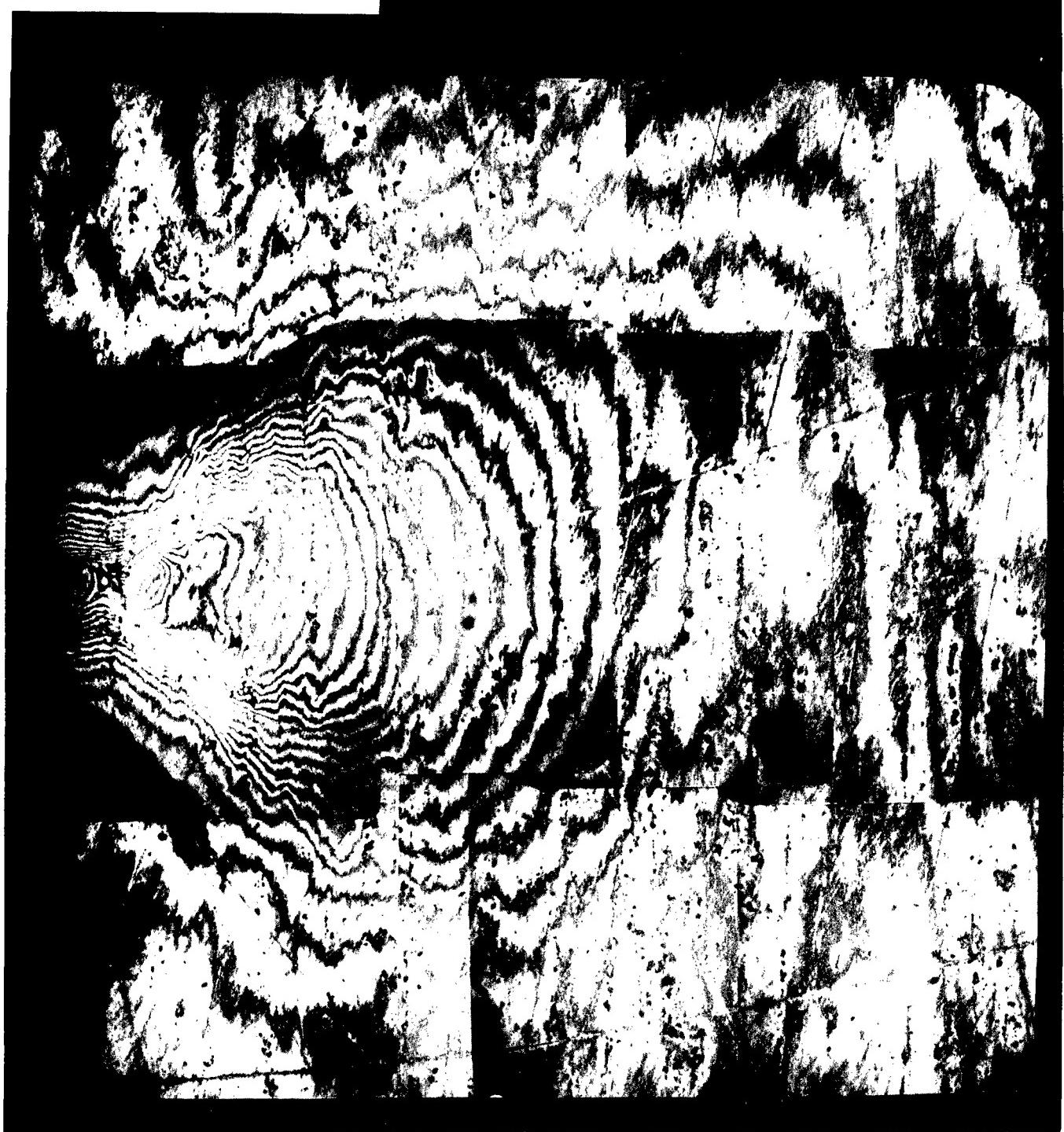


Figure 127. Interferometry Photograph of a Crack Unloaded from a Single Overload in a 2024-T351 Specimen

2024-T351, $a = 1.005$ inch
 $\sigma_x = -5.0$, $\sigma_y = 10$ ksi unloaded
Magnification: 45.4X
Test Case 110
Specimen 2-41-5.1

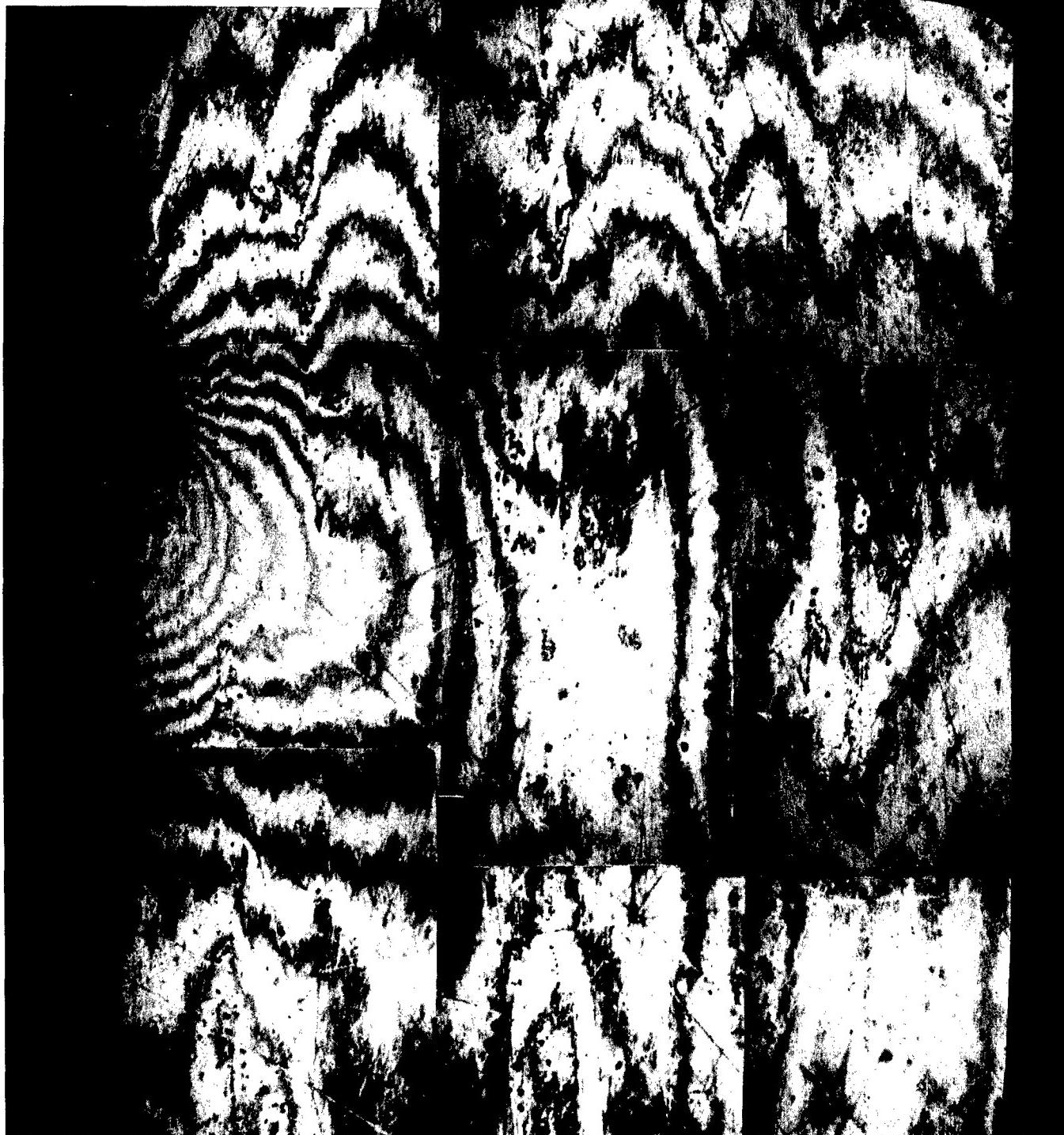


Figure 128. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 1.005$ inch
 $\sigma_x = -5.0$, $\sigma_y = 10$ ksi unloaded
Magnification: 47.3X
Test Case 110
Specimen 2-41-5.2



Figure 129. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 1.02$ inch
 $\sigma_x = -10$, $\sigma_y = 20$ ksi overloaded
Magnification: 34.5X
Test Case 110
Specimen 2-41-6

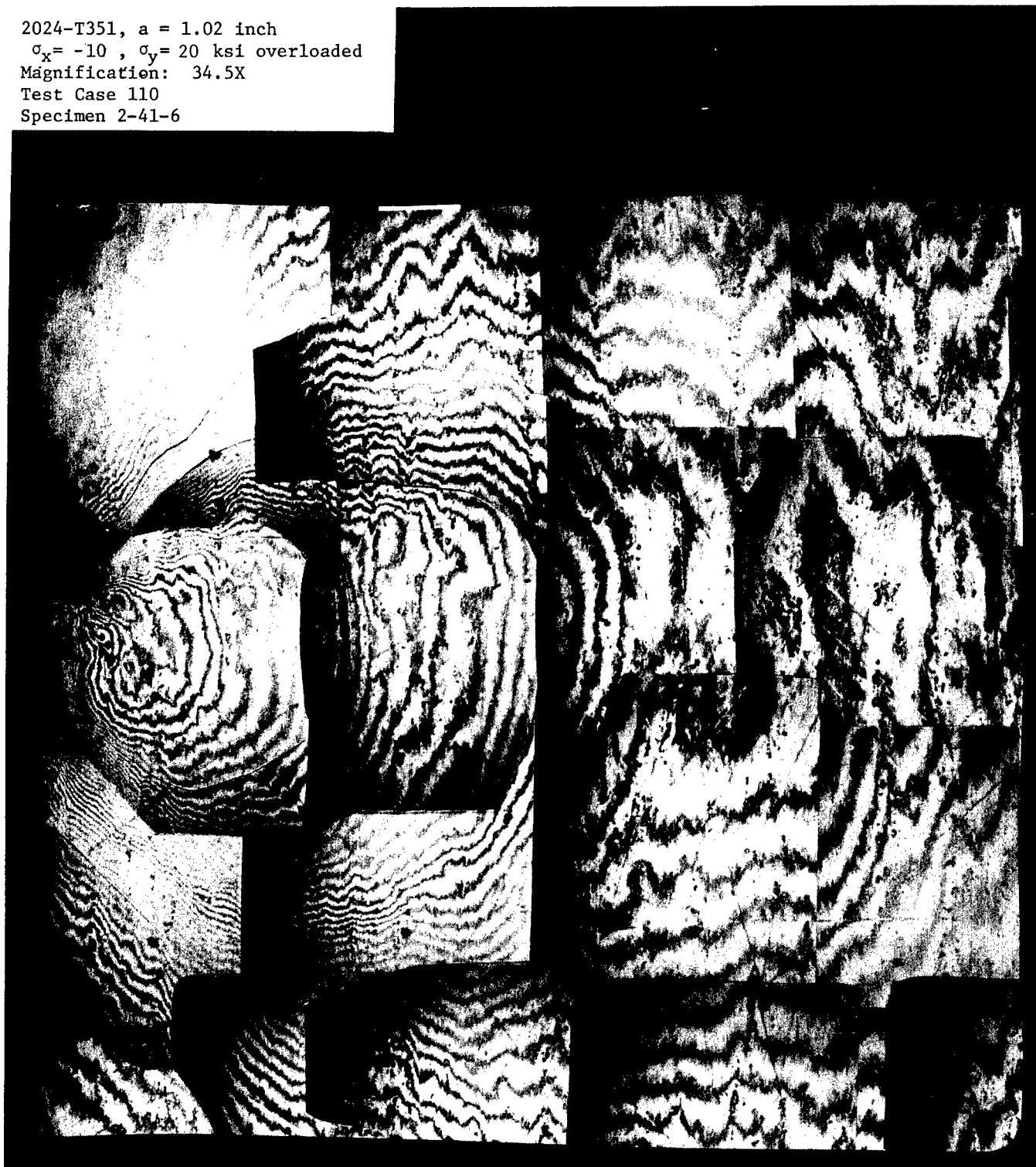


Figure 130. Interferometry Photograph of a Crack Unloaded from a Single Overload in a 2024-T351 Specimen

7075-T7351, $a = 0.275$ inch
 $\sigma_x = 1.2$, $\sigma_y = 12$ ksi unloaded
Magnification: 51.5X
Test Case 39
Specimen 7-54-1



Figure 131. Interferometry Photograph
of an Unloaded Crack in a
7075-T7351 Specimen

7075-T7351, $a = 0.495$ inch
 $\sigma_x = 1.2$, $\sigma_y = 12$ ksi unloaded
Magnification: 47.0X
Test Case 39
Specimen 7-54-2.1



Figure 132. Interferometry Photograph of an Unloaded Crack
in a 7075-T7351 Specimen

7075-T7351, $a = 0.495$ inch
 $\sigma_x = 1.2$, $\sigma_y = 12$ ksi unloaded
Magnification: 46.6X
Test Case 39
Specimen 7-54-2.2



Figure 133. Interferometry Photograph of
an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.745$ inch
 $\sigma_x = 1.2$, $\sigma_y = 12$ ksi unloaded
Magnification: 47.1X
Test Case 39
Specimen 7-54-3

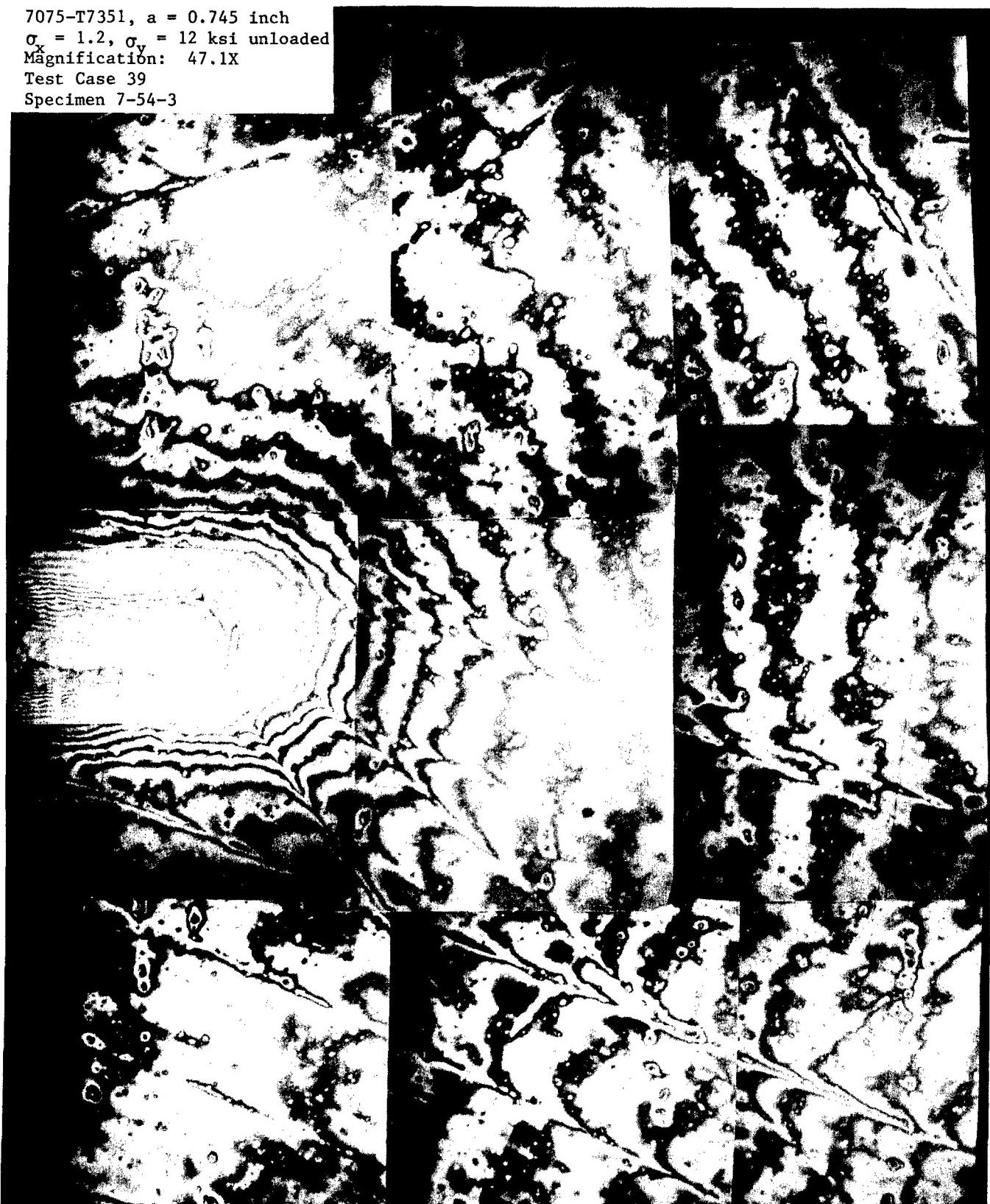


Figure 134. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.990$ inch
 $\sigma_x = 1.2$, $\sigma_y = 12$ ksi unloaded
Magnification: 24.9X
Test Case 39
Specimen 7-54-4

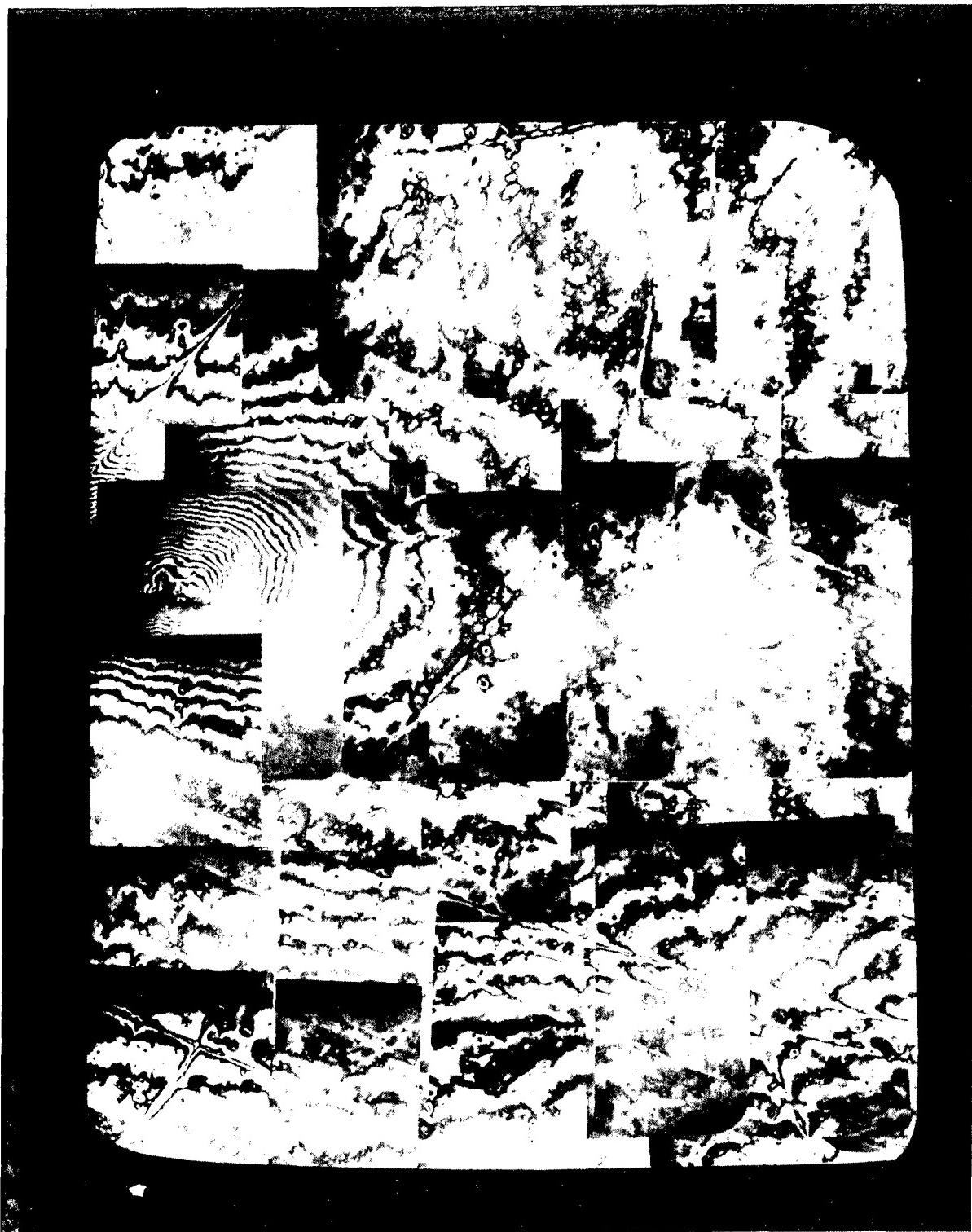


Figure 135. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.250$ inch
 $\sigma_x = .60$, $\sigma_y = 12$ ksi unloaded
Magnification: 48.9X
Test Case 41
Specimen 7-106-1



Figure 136. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.505$ inch
 $\sigma_x = .60$, $\sigma_y = 12$ ksi unloaded
Magnification: 56.0X
Test Case 41
Specimen 7-106-2

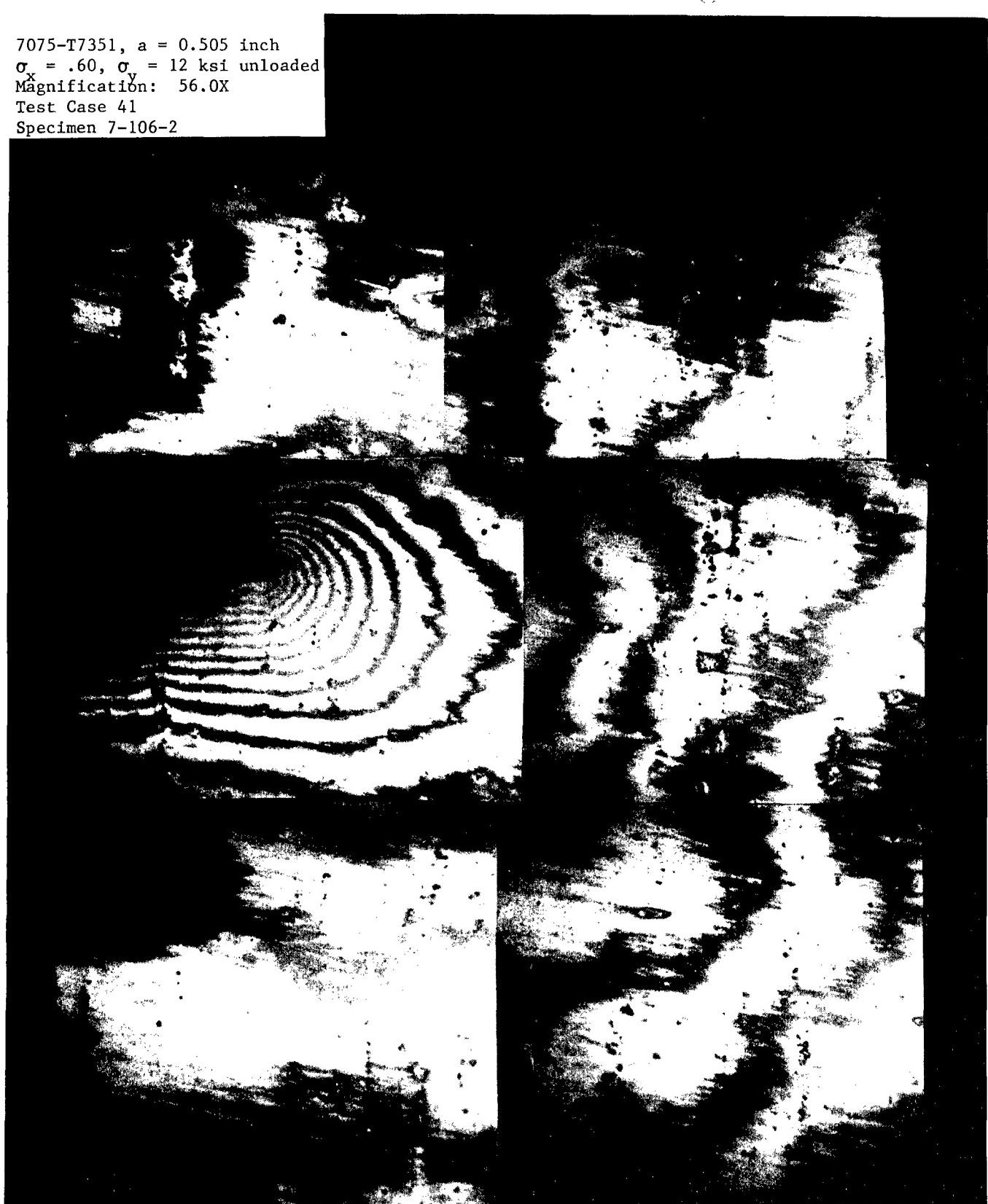


Figure 137. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.75$ inch
 $\nu_x = .60$, $\sigma_y = 12$ ksi unloaded
Magnification: 49.1X
Test Case 41
Specimen 7-106-3



Figure 138. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.50$ inch
 $\sigma_x = -4.2$, $\sigma_y = 12$ ksi unloaded
Magnification: 45.0X
Test Case 42
Specimen 7-42-1

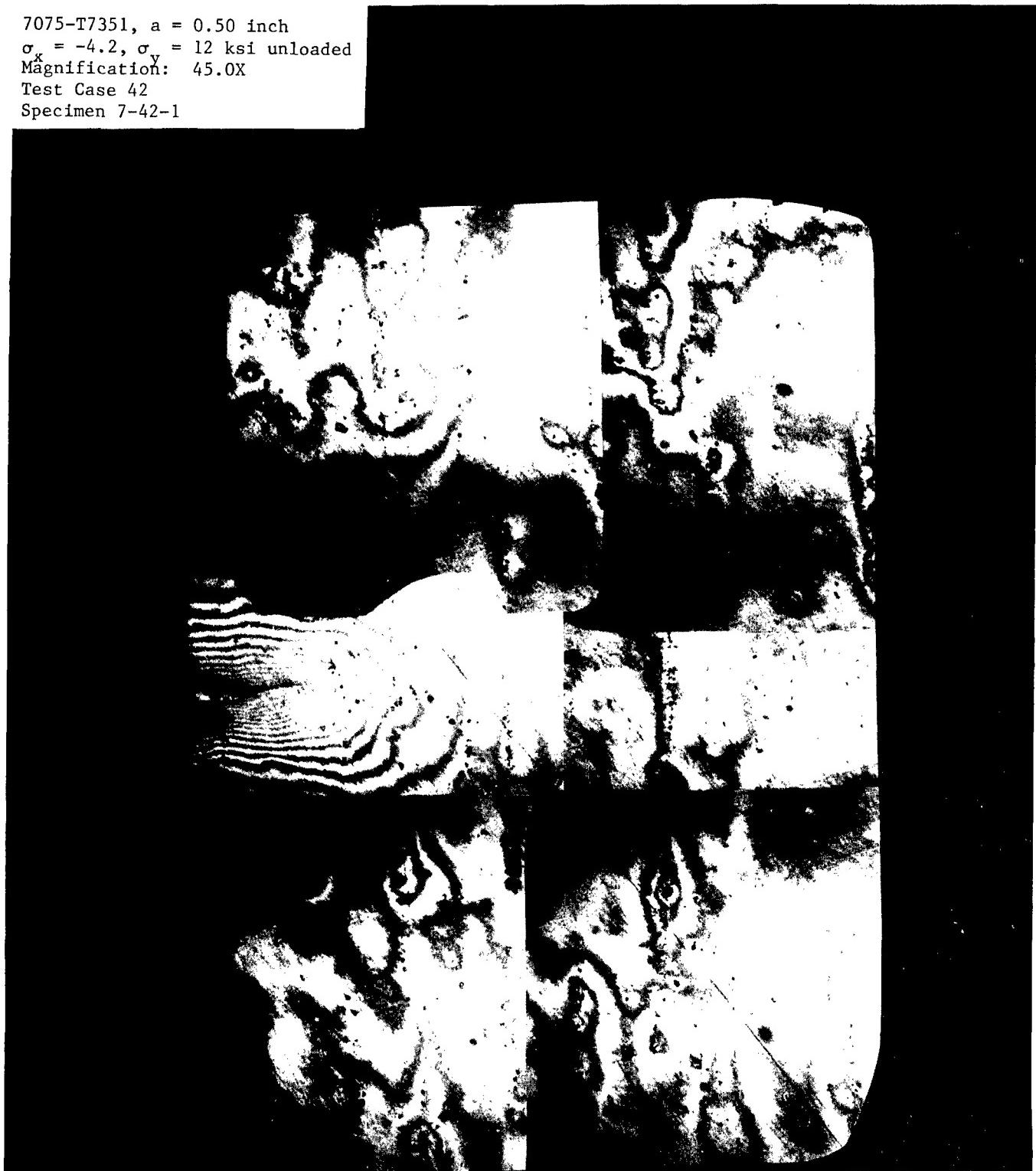


Figure 139. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.50$ inch
 $\sigma_x = -4.2$, $\sigma_y = 12$ ksi at load
Magnification: 45.3X
Test Case 42
Specimen 7-42-2

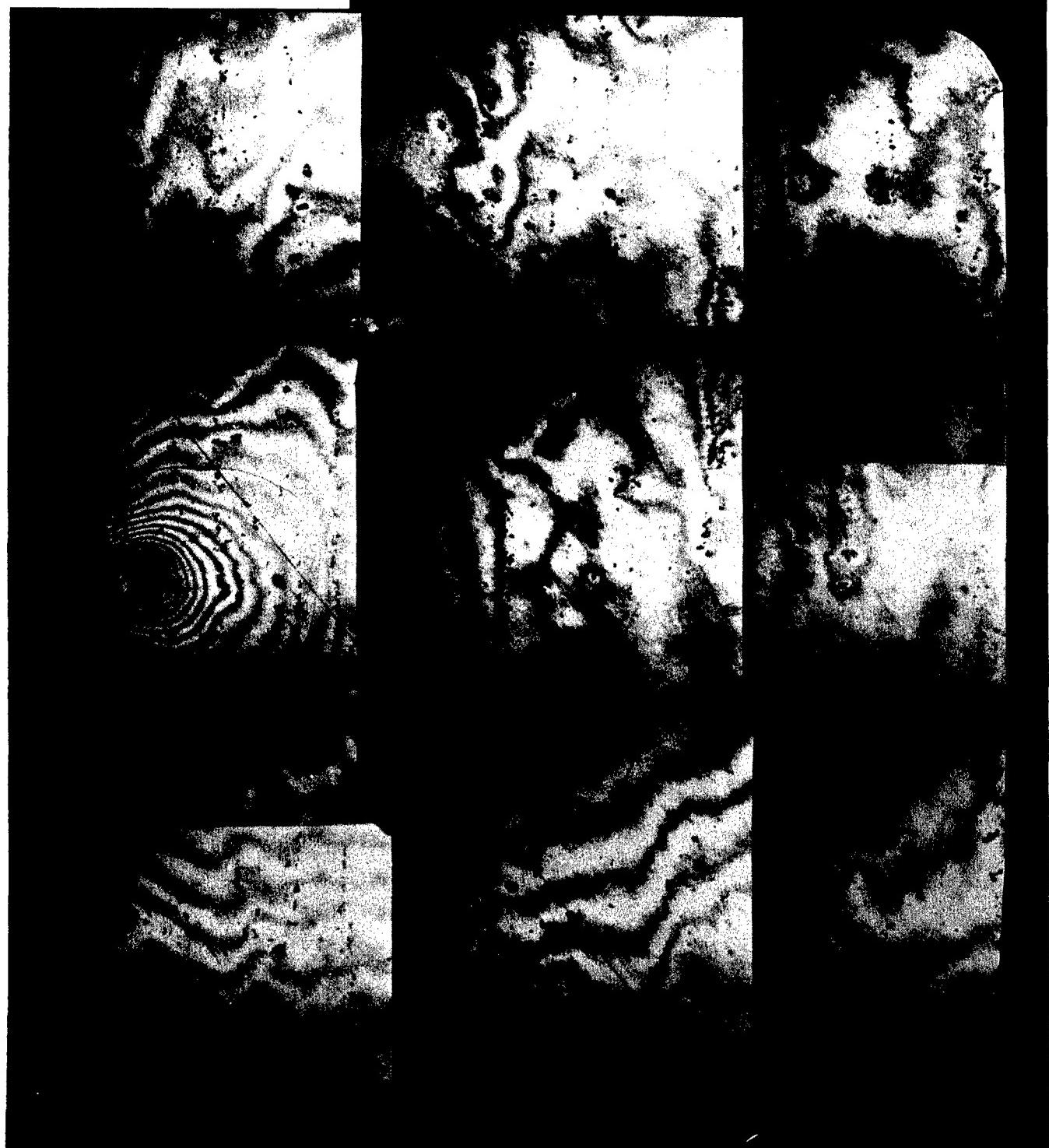


Figure 140. Interferometry Photograph of a Loaded Crack in a
7075-T7351 Specimen

7075-T7351, $a = 1.02$ inch
 $\sigma_x = -4.2$, $\sigma_y = 12$ ksi unloaded
Magnification: 45.5X
Test Case 42
Specimen 7-42-3

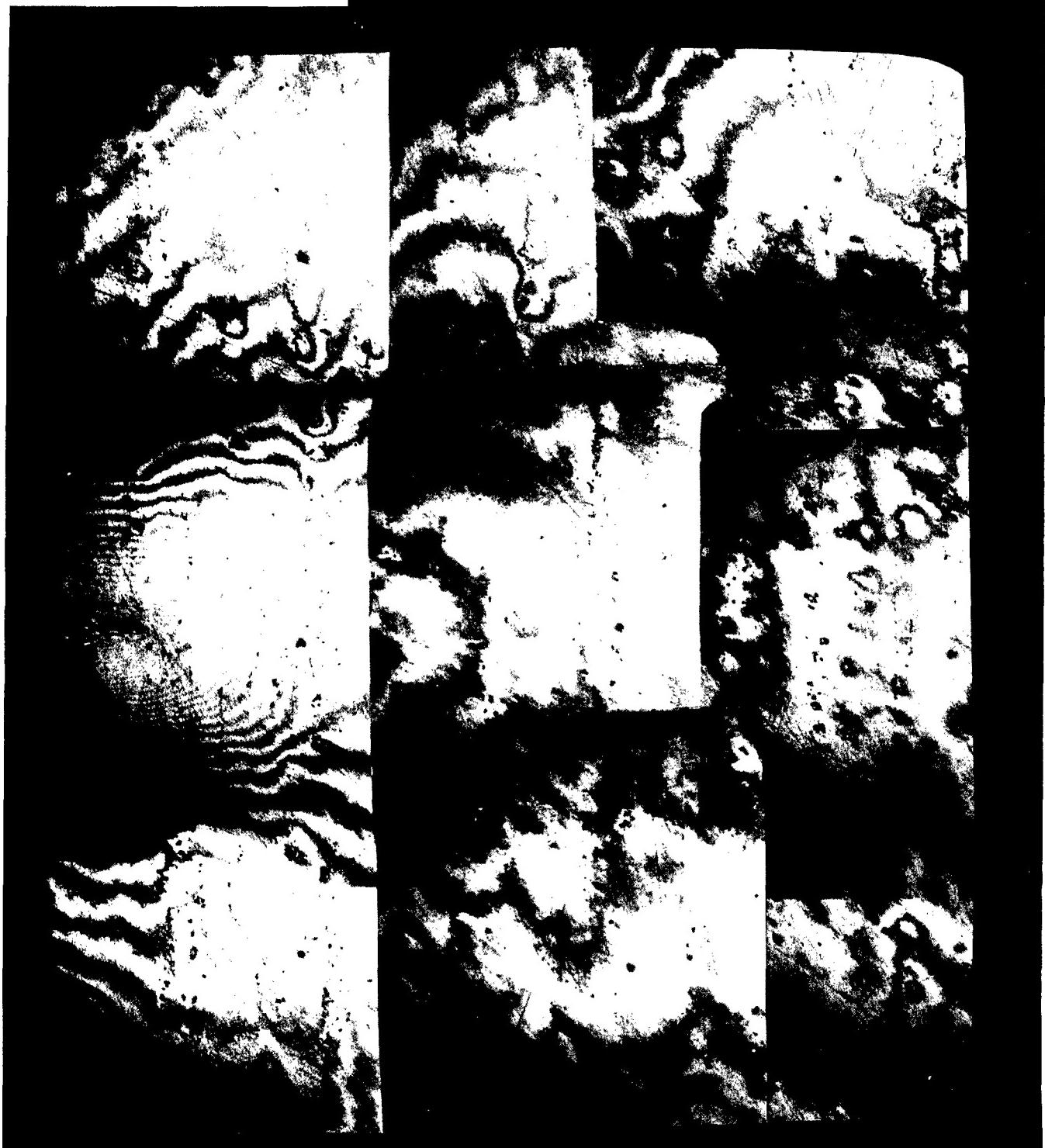


Figure 141. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 1.02$ inch
 $\sigma_x = -4.2$, $\sigma_y = 12$ ksi at load
Magnification: 44.8X
Test Case 42
Specimen 7-42-4

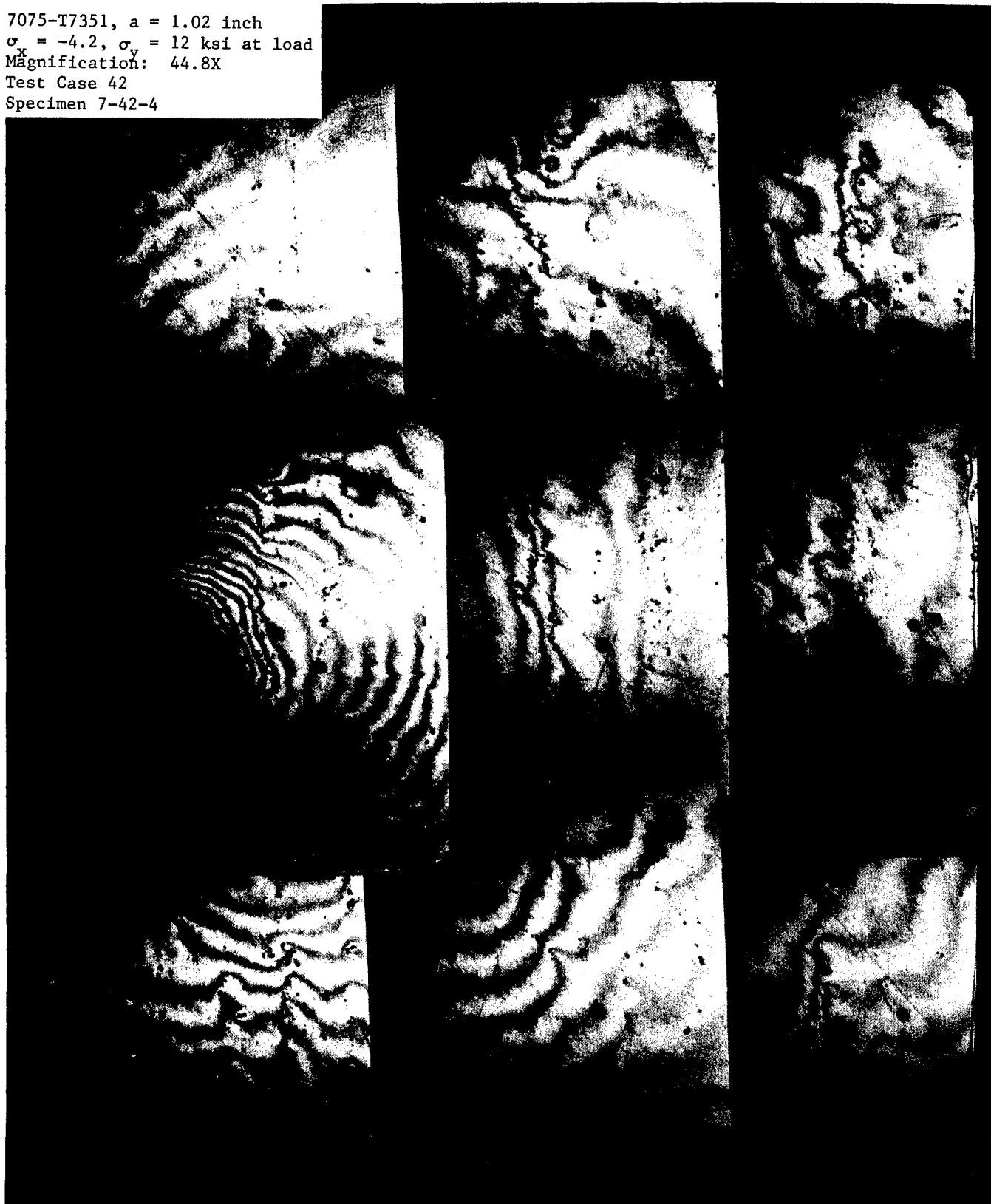


Figure 142. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

2024-T351, $a = 0.245$ inch
 $\sigma_x = 1.0$, $\sigma_y = 10$ ksi unloaded
Magnification: 48.5X
Test Case 43
Specimen 2-12-1

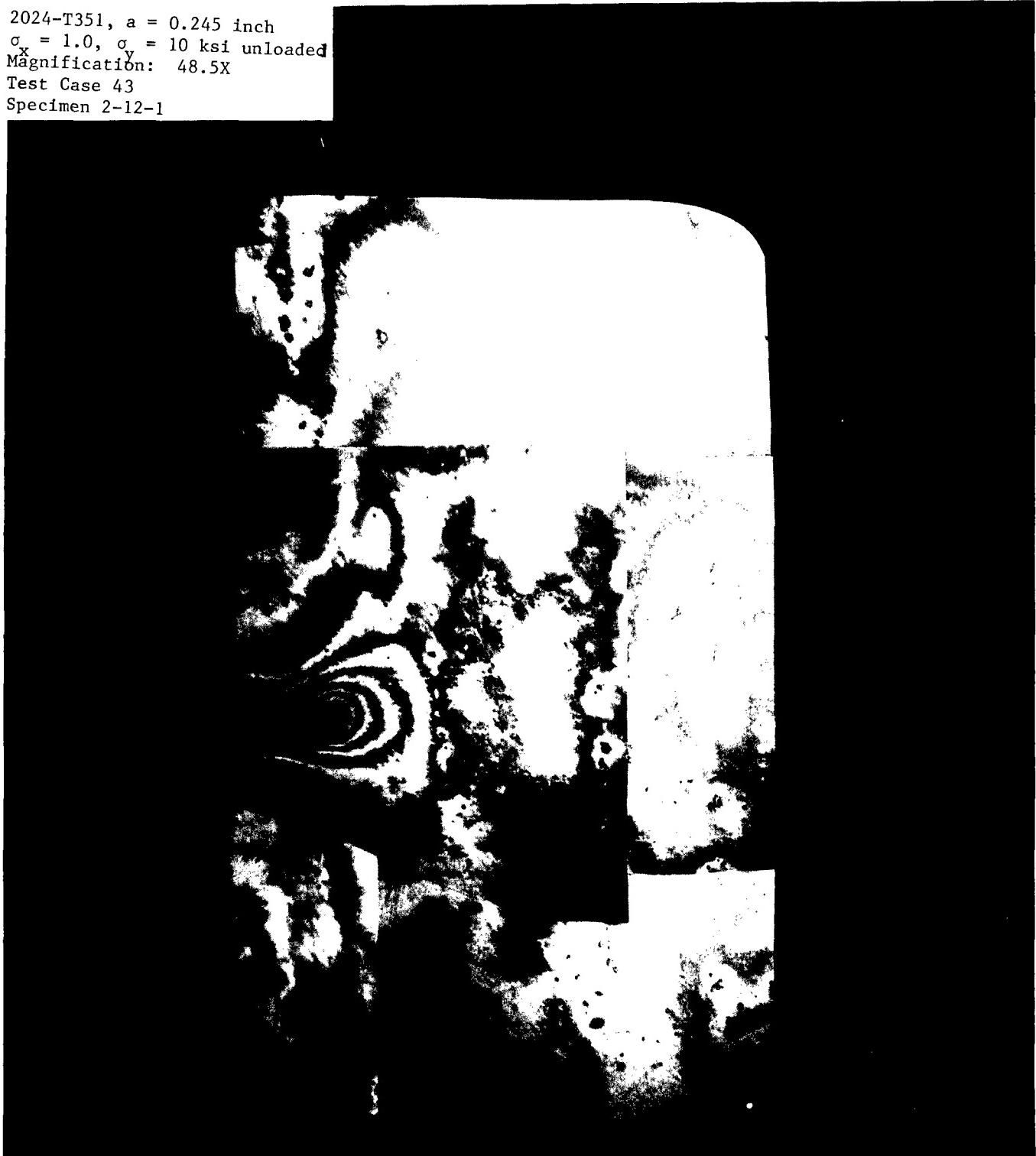


Figure 143. Interferometry Photograph of an Unloaded Crack
in a 2024-T351 Specimen

2024-T351, $a = 0.5$ inch
 $\sigma_x = 1.0$, $\sigma_y = 10$ ksi unloaded
Magnification: 48.5X
Test Case 43
Specimen 2-12-2



Figure 144. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.5$ inch
 $\sigma_x = 1.0$, $\sigma_y = 10$ ksi at load
Magnification: 45.6X
Test Case 43
Specimen 2-12-3

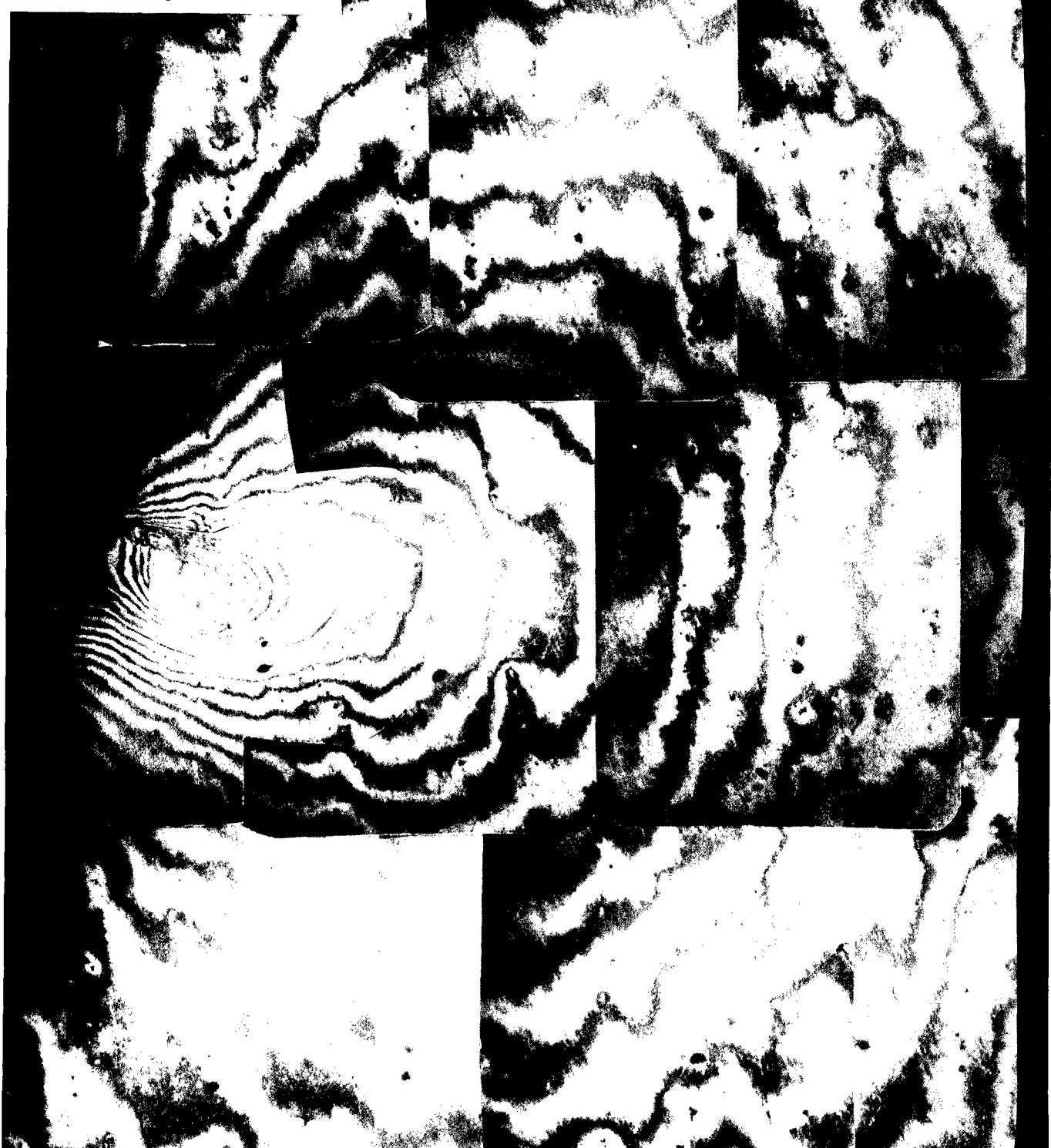


Figure 145. Interferometry Photograph of a Loaded Crack in a
2024-T351 Specimen

2024-T351, $a = 0.985$ inch
 $\sigma_x = 1.0$, $\sigma_y = 10$ ksi unloaded
Magnification: 48.0X
Test Case 43
Specimen 2-12-4

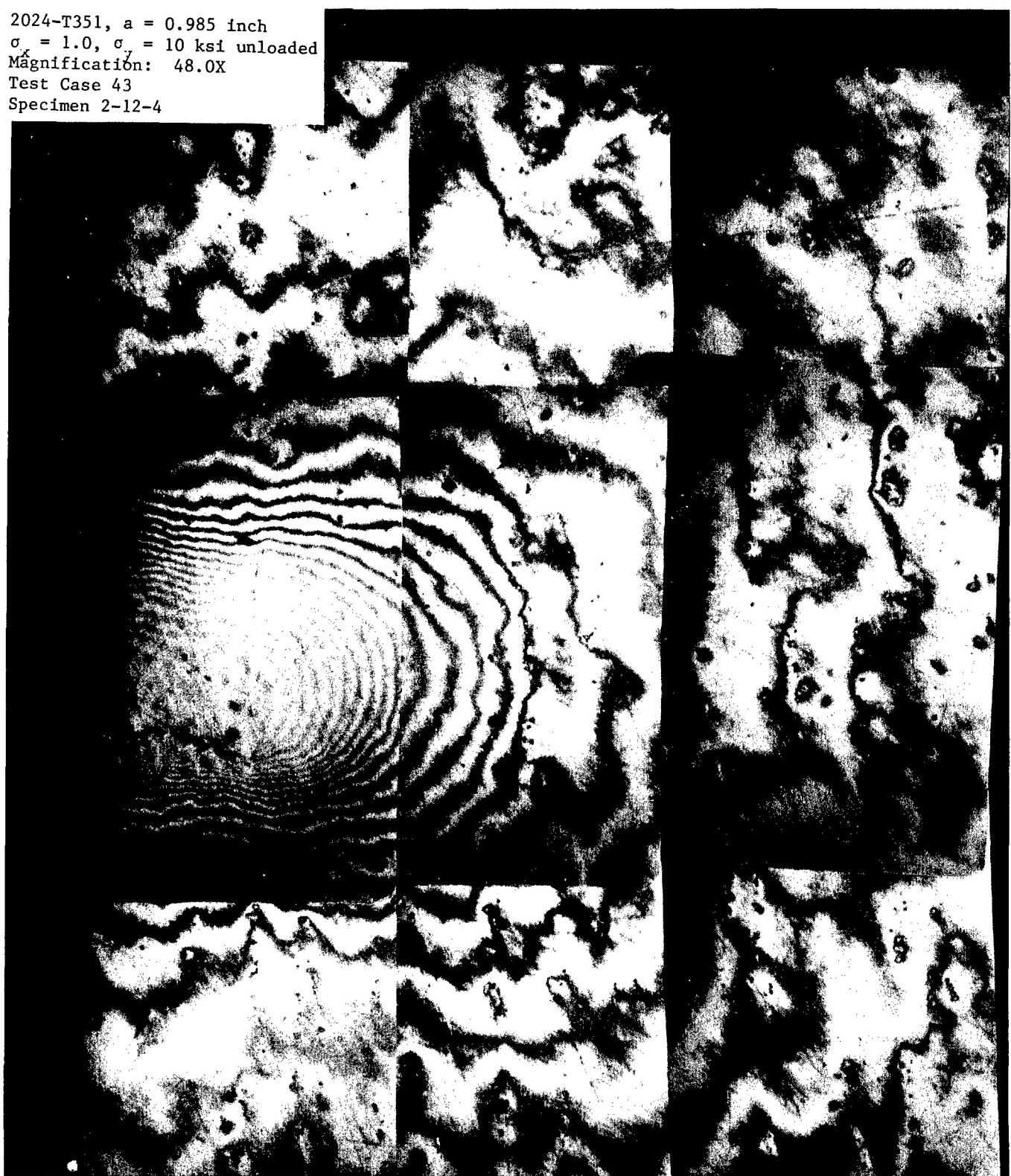


Figure 146. Interferometry Photograph of an Unloaded Crack
in a 2024-T351 Specimen

24-T351, $a = 0.985$ inch
 $\sigma_y = 1.0$, $\sigma_x = 10$ ksi at load
Magnification: 31.8X
Test Case 43
Specimen 2-12-5



Figure 147. Interferometry Photograph of a Loaded Crack in a 2024-T351 Specimen

7075-T7351, $a = 0.5$ inch
 $\sigma_x = -8.4$, $\sigma_y = 12$ ksi unloaded
Magnification: 45.0X
Test Case 44
Specimen 2-35-1

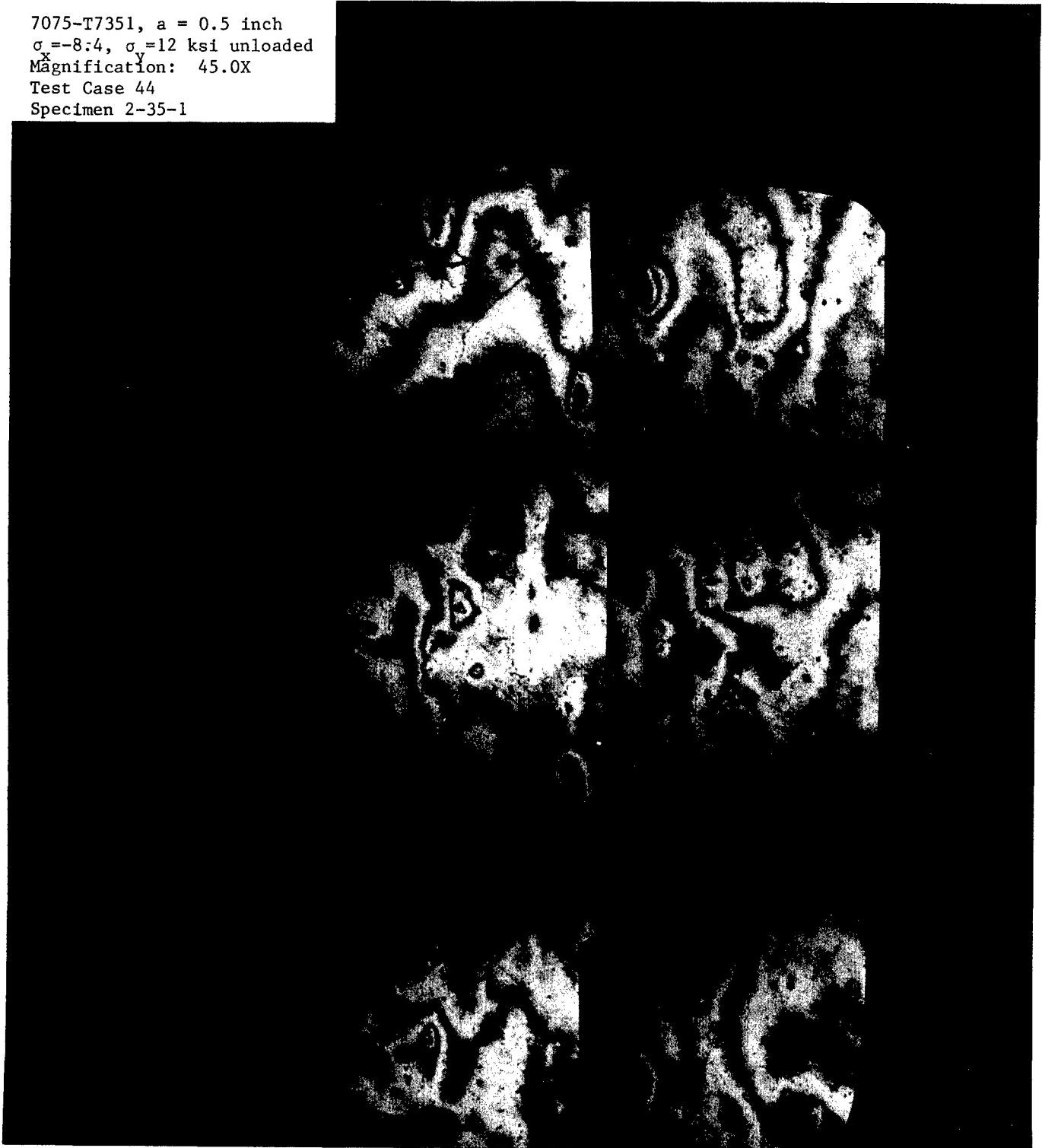


Figure 148. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.5$ inch
 $\sigma_x = -8.4$, $\sigma_y = 12$ ksi at load
Magnification: 45.2X
Test Case 44
Specimen 2-35-2



Figure 149. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 1.02$ inch
 $\sigma_x = -8.4$, $\sigma_y = 12$ ksi unloaded
Magnification: 45.0X
Test Case 44
Specimen 2-35-3.1

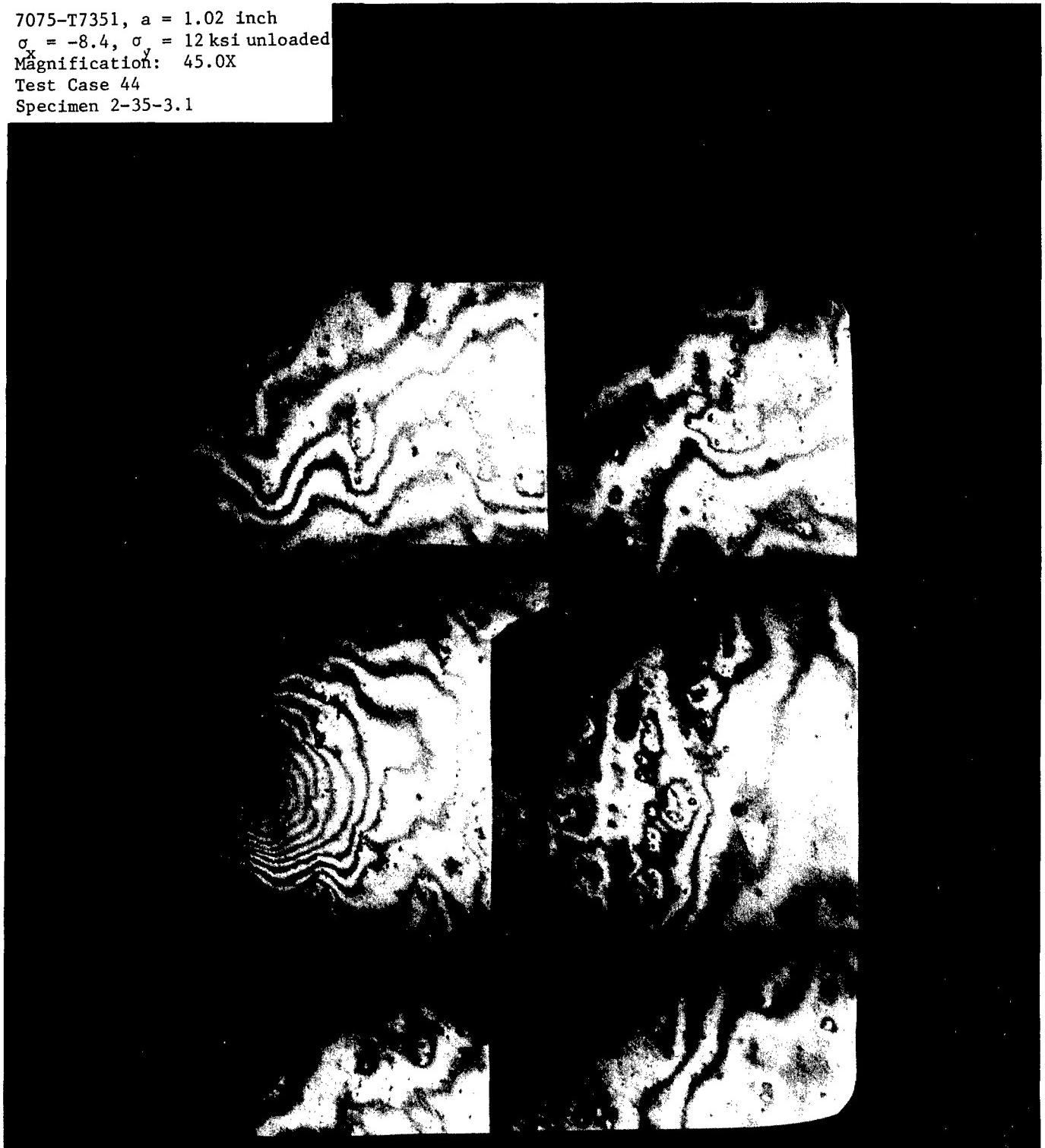


Figure 150. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 1.02$ inch
 $\sigma_x = -8.4$, $\sigma_y = 12$ ksi unloaded
Magnification: 46.5X
Test Case 44
Specimen 2-35-3.2

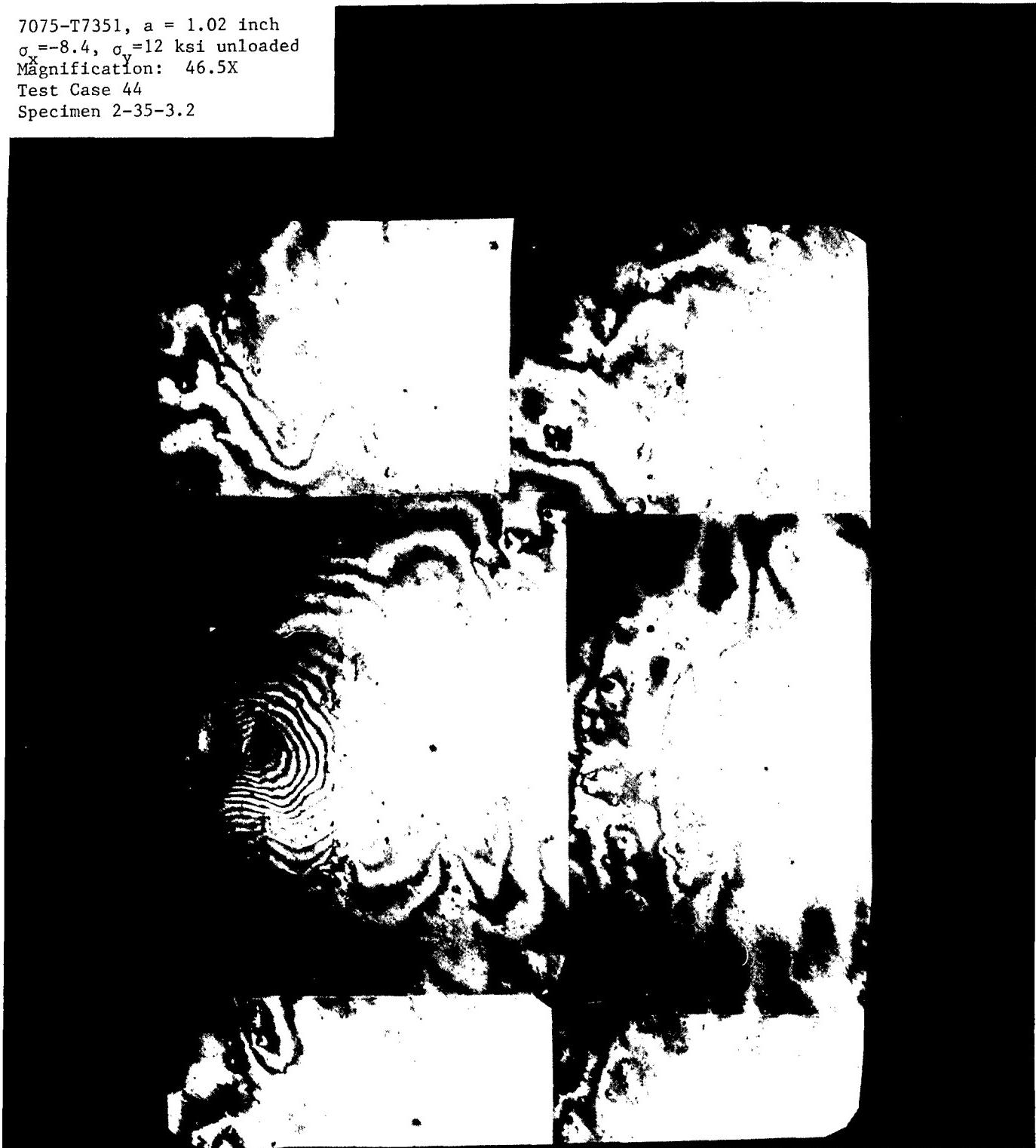


Figure 151. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 1.02$ inch
 $\sigma_x = -8.4$, $\sigma_y = 12$ ksi at load
Magnification: 44.7X
Test Case 44
Specimen 2-35-4



Figure 152. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

2024-T351, $a = 0.25$ inch
 $\sigma_x = 0.5$, $\sigma_y = 10$ ksi unloaded
Magnification: 46.8X
Test Case 45
Specimen 2-7-1



Figure 153. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.25$ inch
 $\sigma_x = 0.5$, $\sigma_y = 10$ ksi at load
Magnification: 47.2X
Test Case 45
Specimen 2-7-2



Figure 154. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.495$ inch
 $\sigma_x = 0.5$, $\sigma_y = 10$ ksi unloaded
Magnification: 44.2X
Test Case 45
Specimen 2-7-3

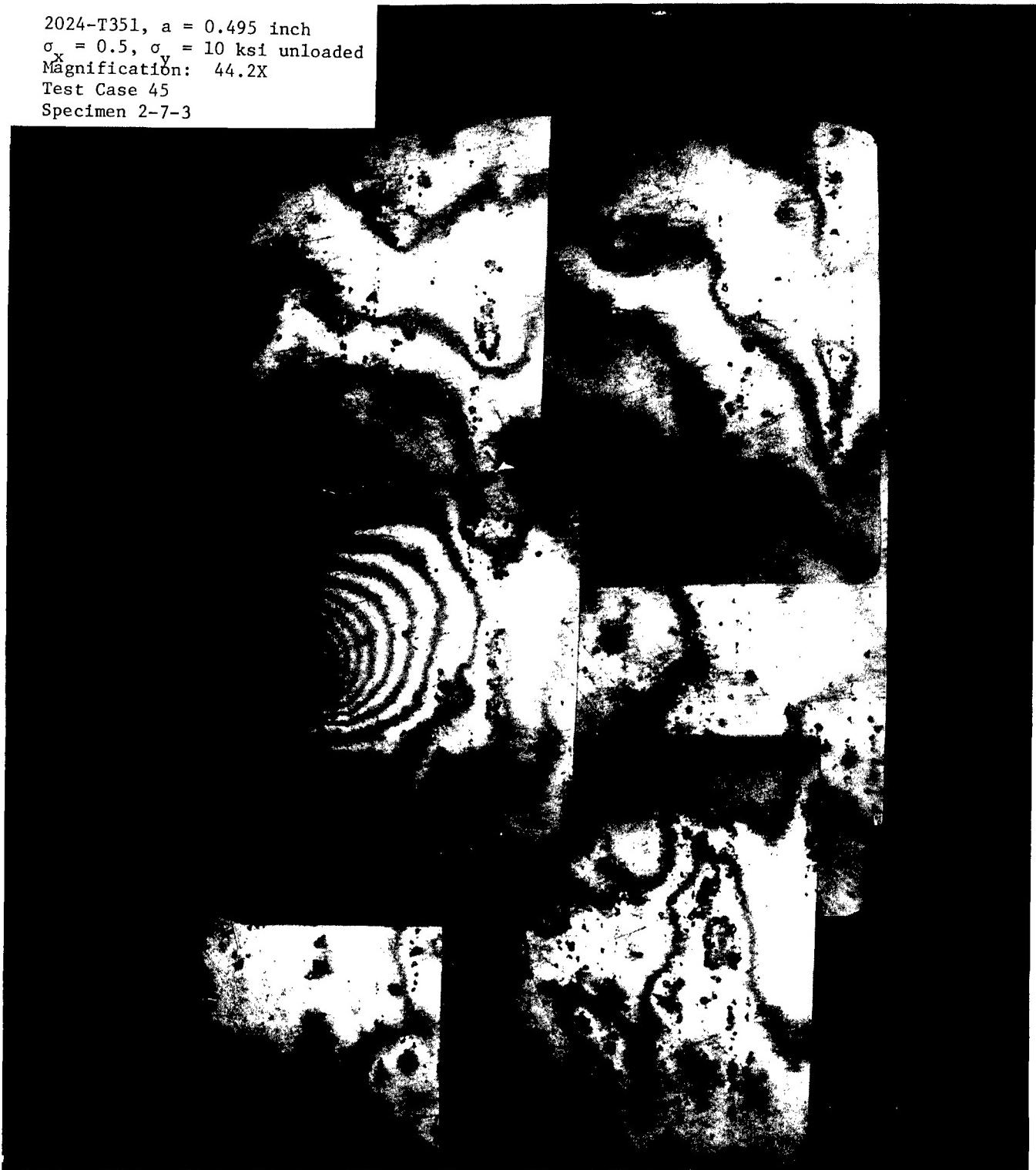


Figure 155. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.495$ inch
 $\sigma_x = 0.5$, $\sigma_y = 10$ ksi at load
Magnification: 45.8X
Test Case 45
Specimen 2-7-4.1



Figure 156. Interferometry Photograph of a Loaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.495$ inch
 $\sigma_x = 0.5$, $\sigma_y = 10$ ksi at load
Magnification: 44.0X
Test Case 45
Specimen 2-7-4-2

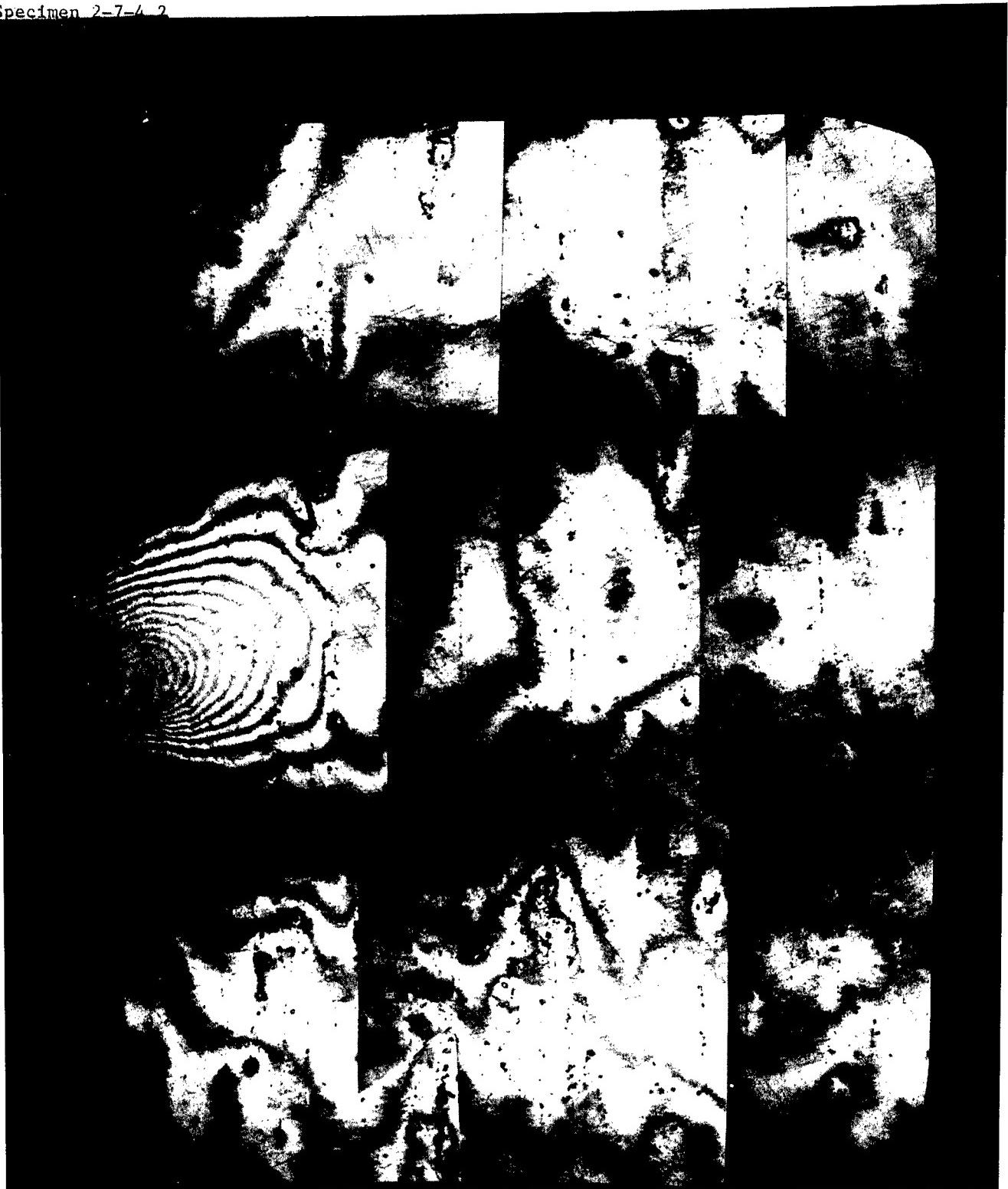


Figure 157. Interferometry Photograph of a Loaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.99$ inch
 $\sigma_c = 0.5$, $\sigma_u = 10$ ksi unloaded
Magnification: 47.9X
Test Case 45
Specimen 2-7-5



Figure 158. Interferometry Photograph of an Unloaded Crack in a 2024-T351 Specimen

2024-T351, $a = 0.99$ inch
 $\sigma_x = 0.5$, $\sigma_y = 10$ ksi at load
Magnification: 46.6X
Test Case 45
Specimen 2-7-6



Figure 159. Interferometry Photograph of a Loaded Crack in a 2024-T351 Specimen

7075-T7351, $a = 0.505$ inch
 $\sigma_x = -4.2, \sigma_y = 12$ ksi unloaded
Magnification: 46.0X
Test Case 46
Specimen 2-27-1

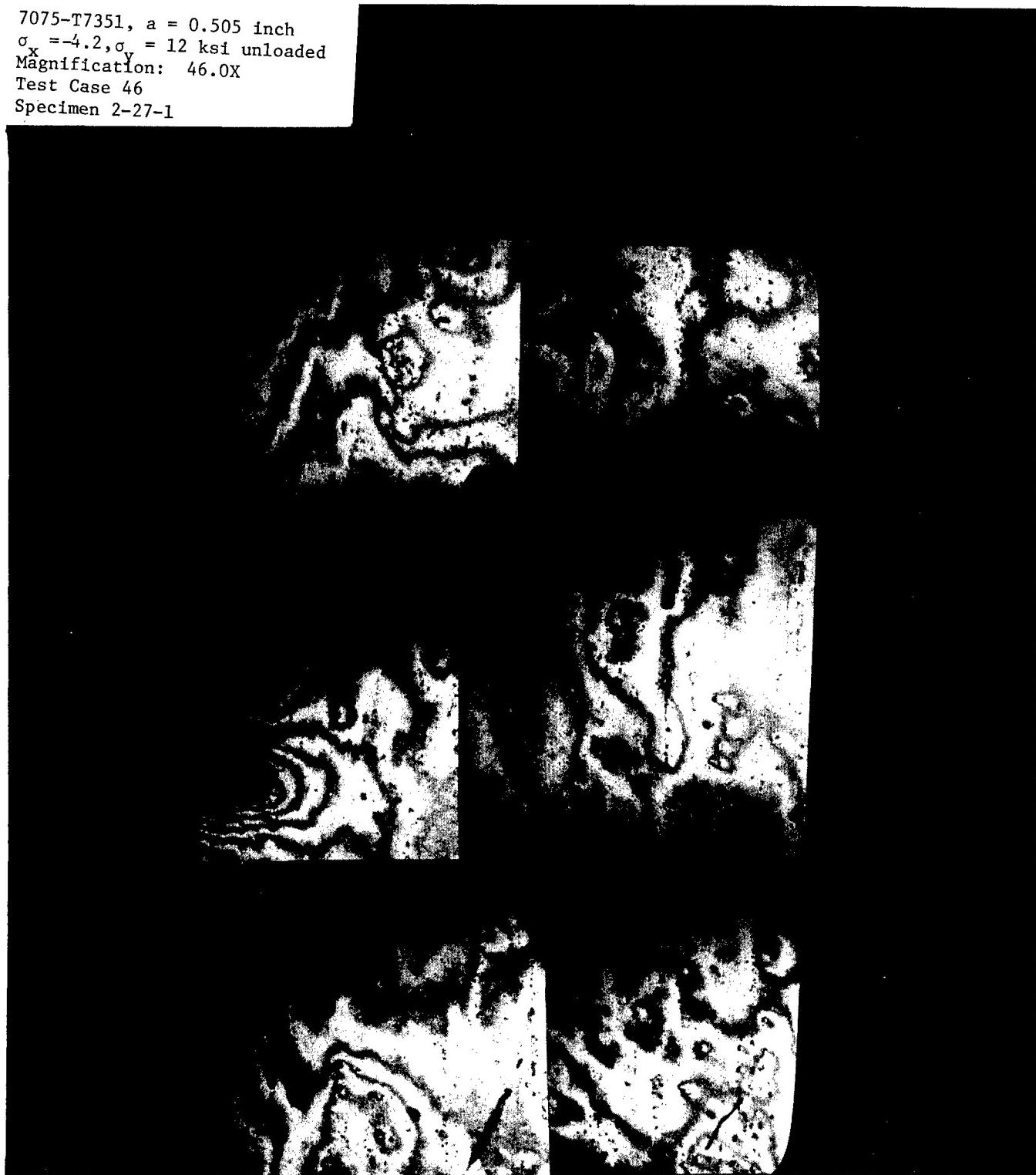


Figure 160. Interferometry Photograph of an Unloaded Crack
in a 7075-T7351 Specimen

7075-T7351, $a = 0.505$ inch
 $\sigma_x = -4.2$, $\sigma_y = 12$ ksi at load
Magnification: 45.9X
Test Case 46
Specimen 2-27-2

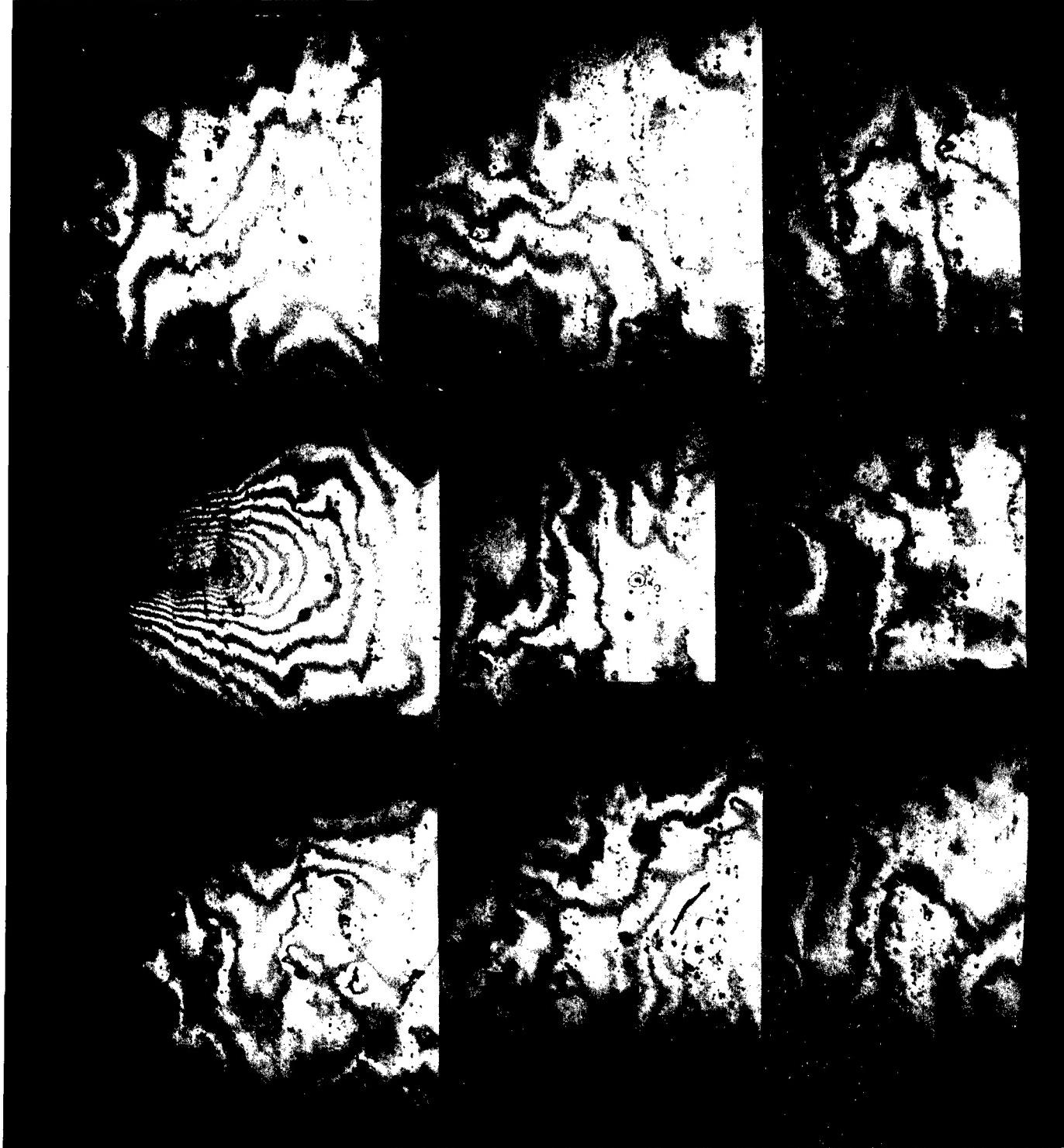


Figure 161. Interferometry Photograph of a Loaded Crack in a
7075-T7351 Specimen

7075-T7351, $a = 1.035$ inch
 $\sigma_x = -4.2$, $\sigma_y = 12$ ksi unloaded
Magnification: 50.6X
Test Case 46
Specimen 2-27-3

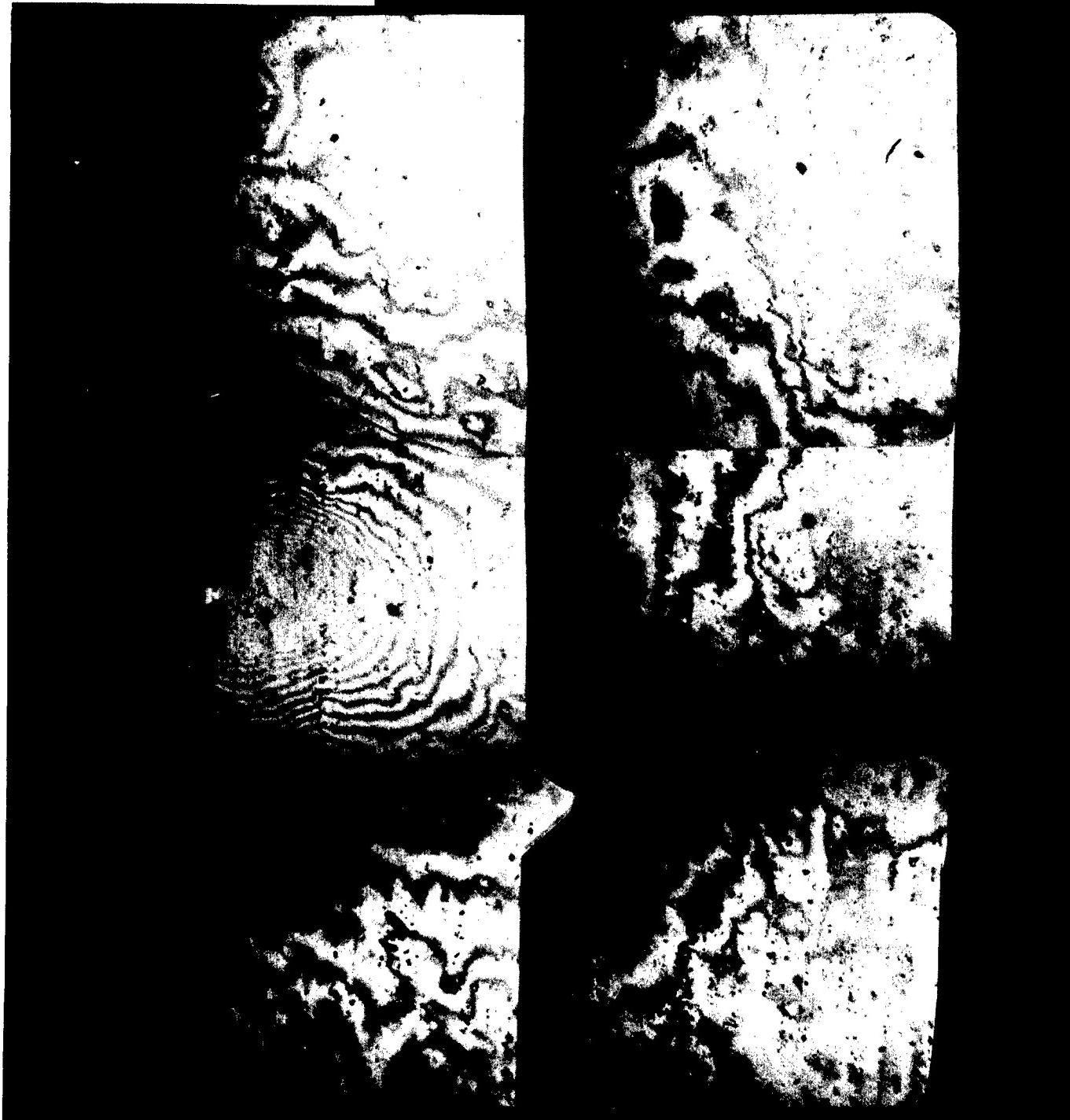


Figure 162. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 1.035$ inch
 $\sigma_x = -4.2$, $\sigma_y = 12$ ksi at load
Magnification: 43.9X
Test Case 46
Specimen 2-27-4

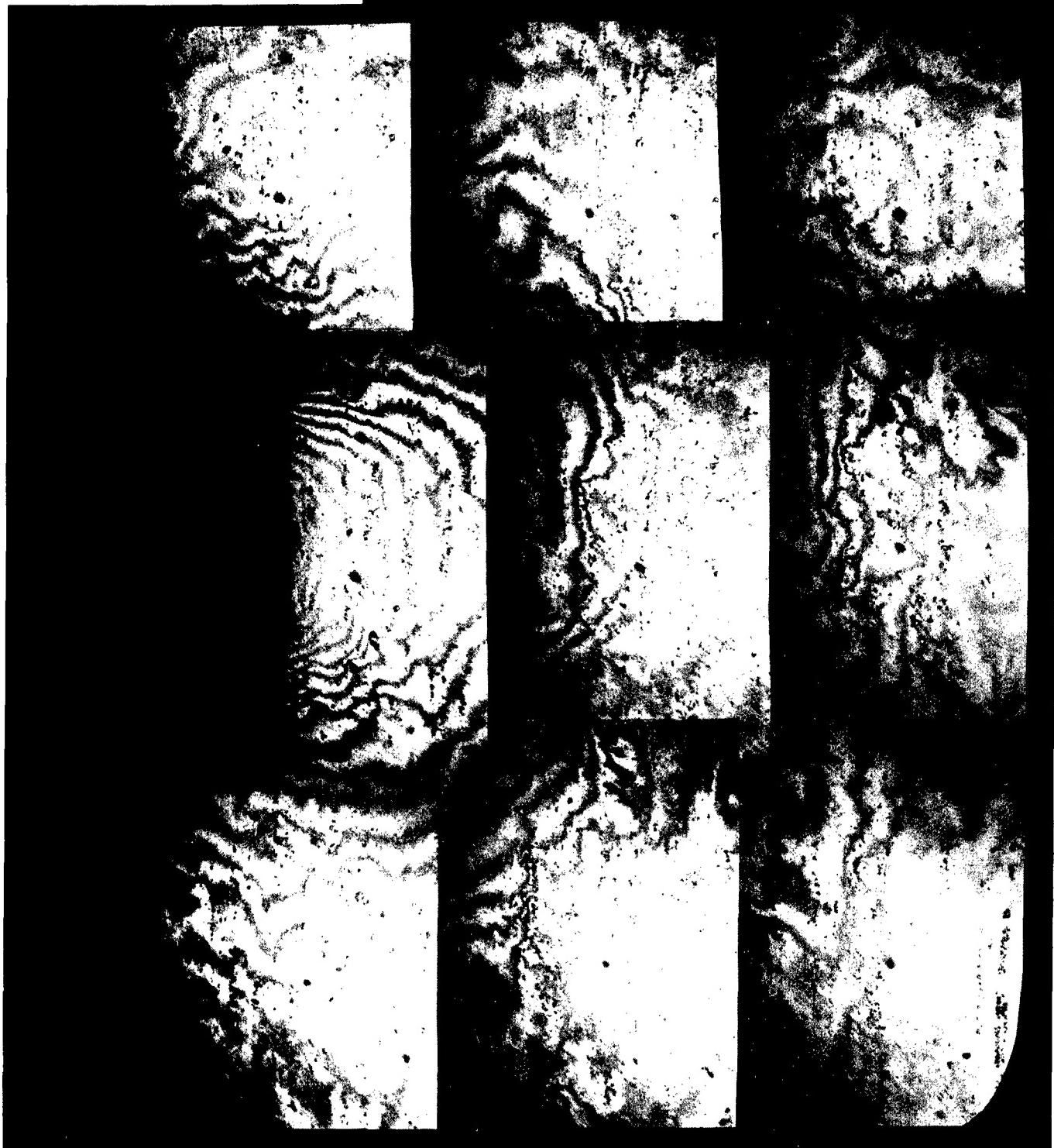


Figure 163. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.75$ inch
 $\sigma_x = 4.2$, $\sigma_y = 12$ ksi unloaded
Magnification: 49.3X
Test Case 72
Specimen 7-116-1



Figure 164. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.75$ inch
 $\sigma_x = 4.2$, $\sigma_y = 12$ ksi at load
Magnification: 37.3X
Test Case 72
Specimen 7-116-2

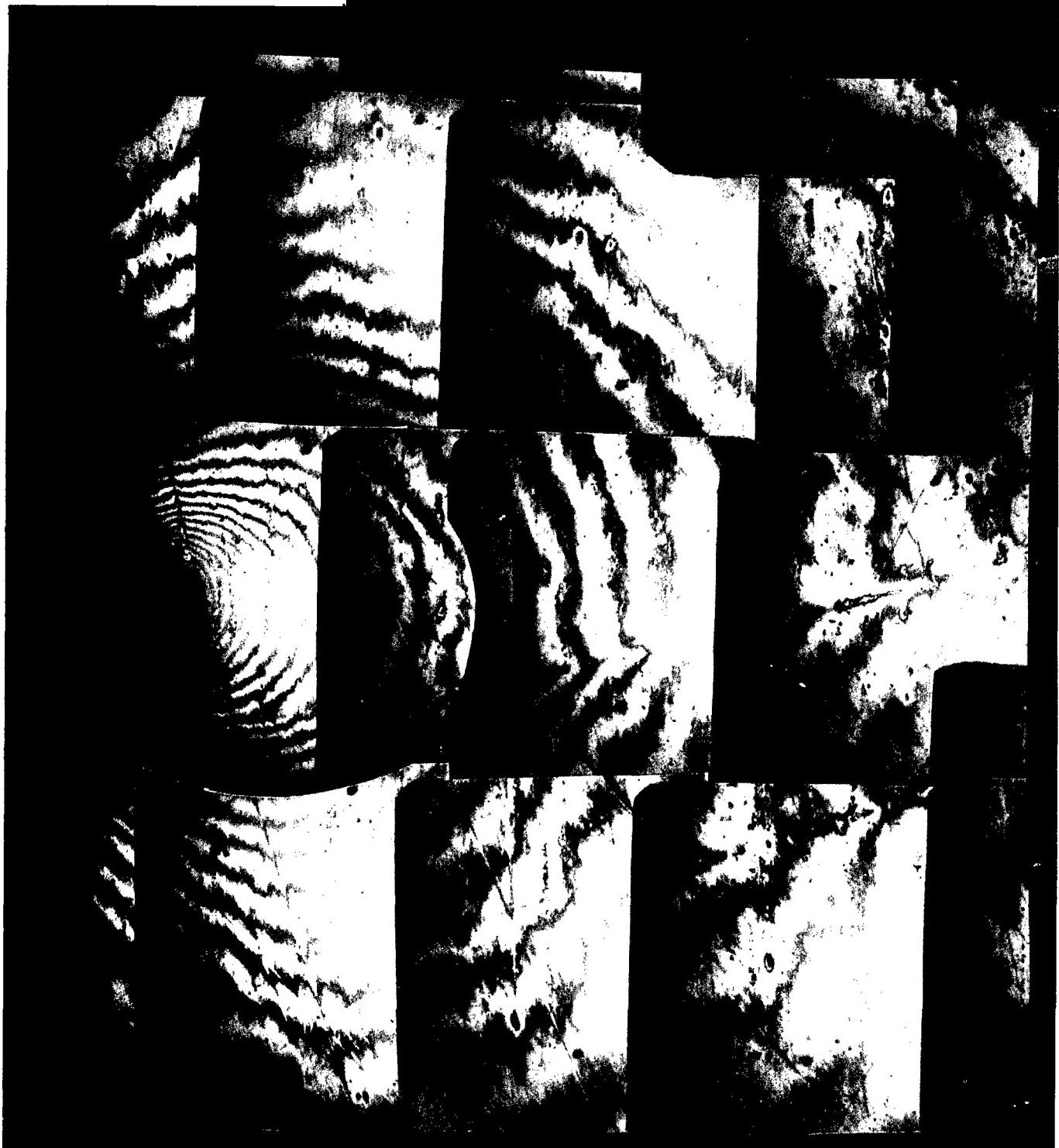


Figure 165. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 1.00$ inch
 $\sigma_x = 4.2$, $\sigma_y = 12$ ksi unloaded
Magnification: 47.4X
Test Case 72
Specimen 7-116-3

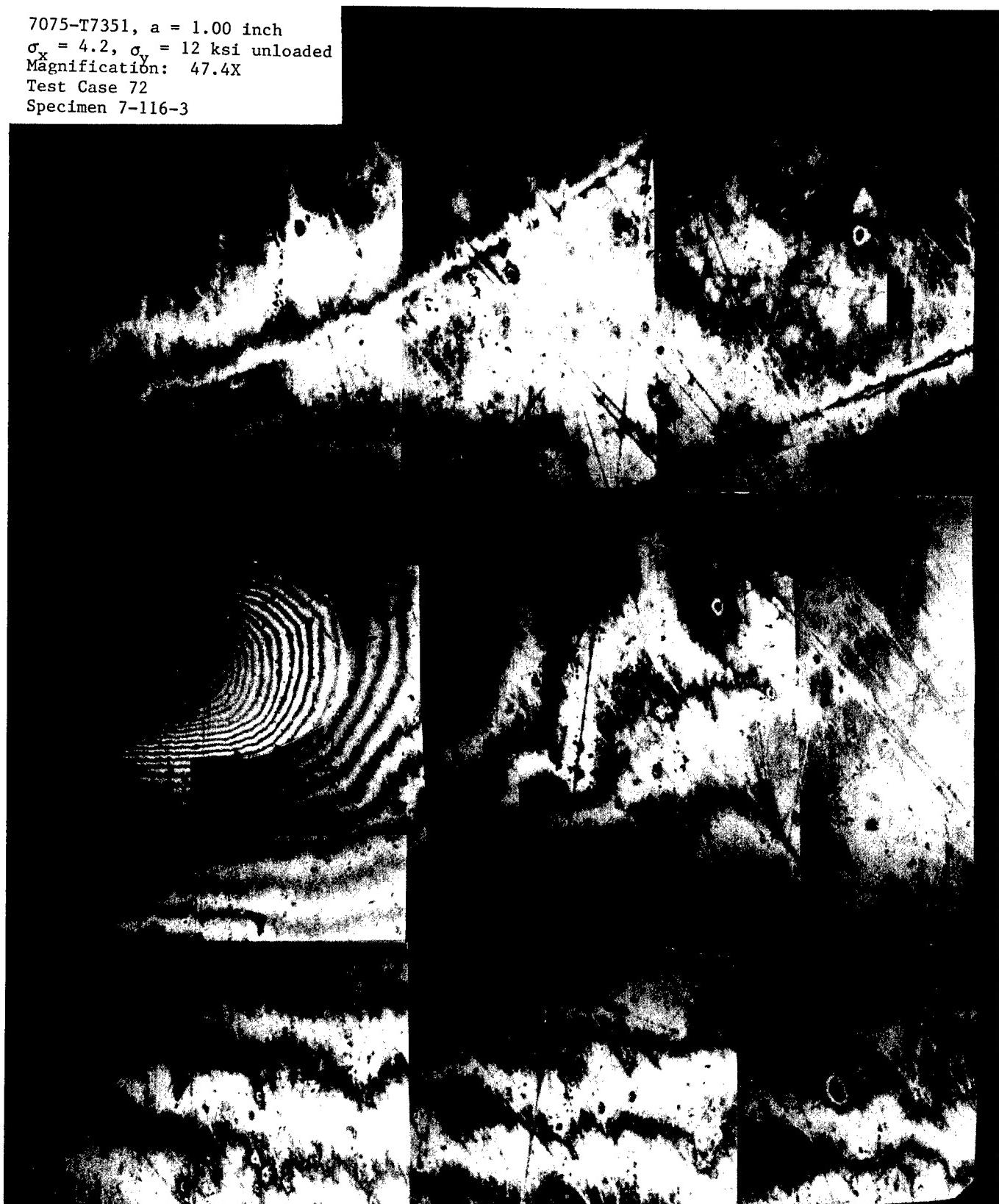


Figure 166. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 1.00$ inch
 $\sigma_x = 4.2$, $\sigma_y = 12$ ksi at load
Magnification: 30.6X
Test Case 72
Specimen 7-116-4

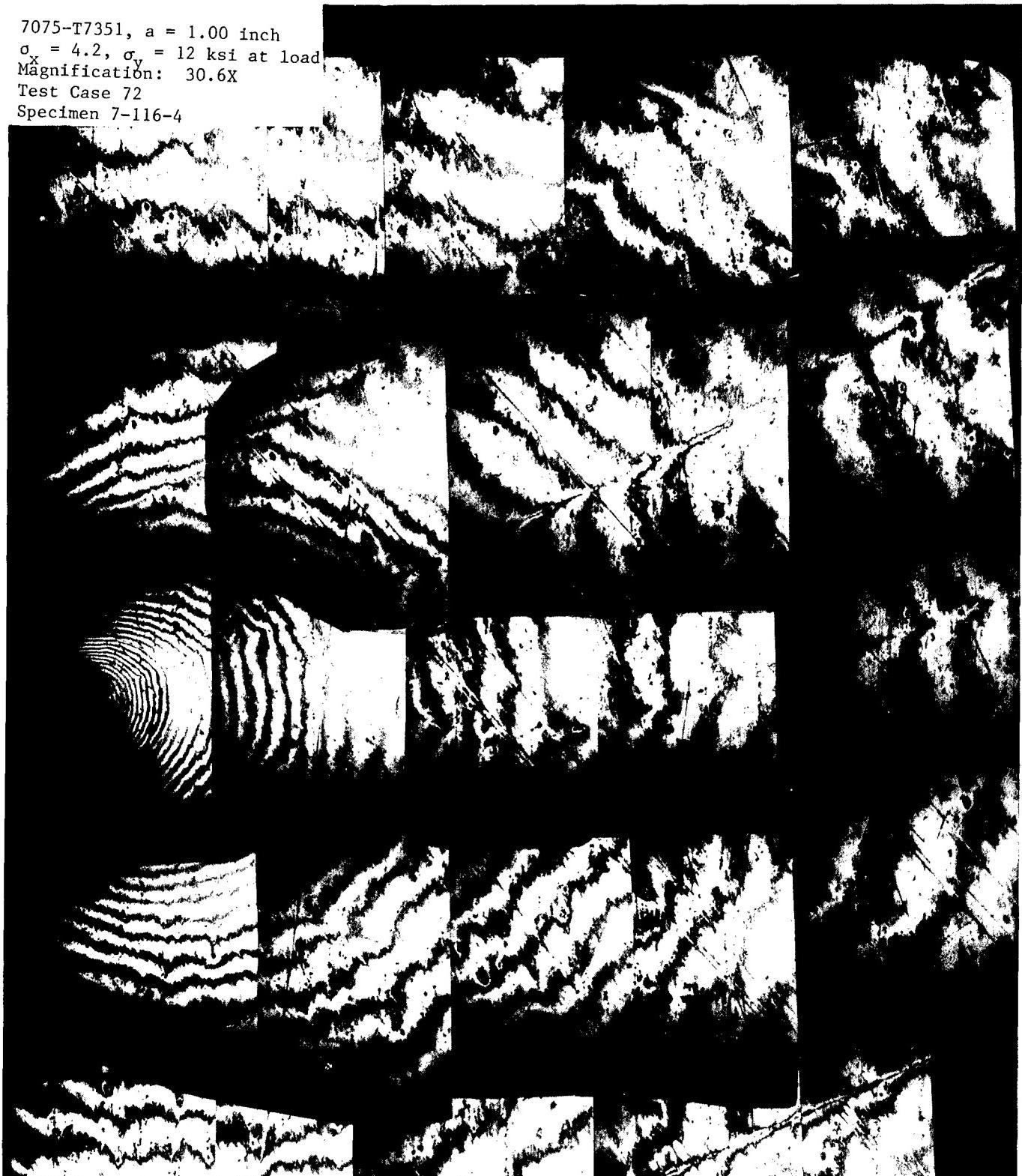


Figure 167. Interferometry Photograph of a Loaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.525$ inch
 $\sigma_x = 4.2$, $\sigma_y = 12$ ksi unloaded
Magnification: 46.6X
Test Case 106
Specimen 2-30-1

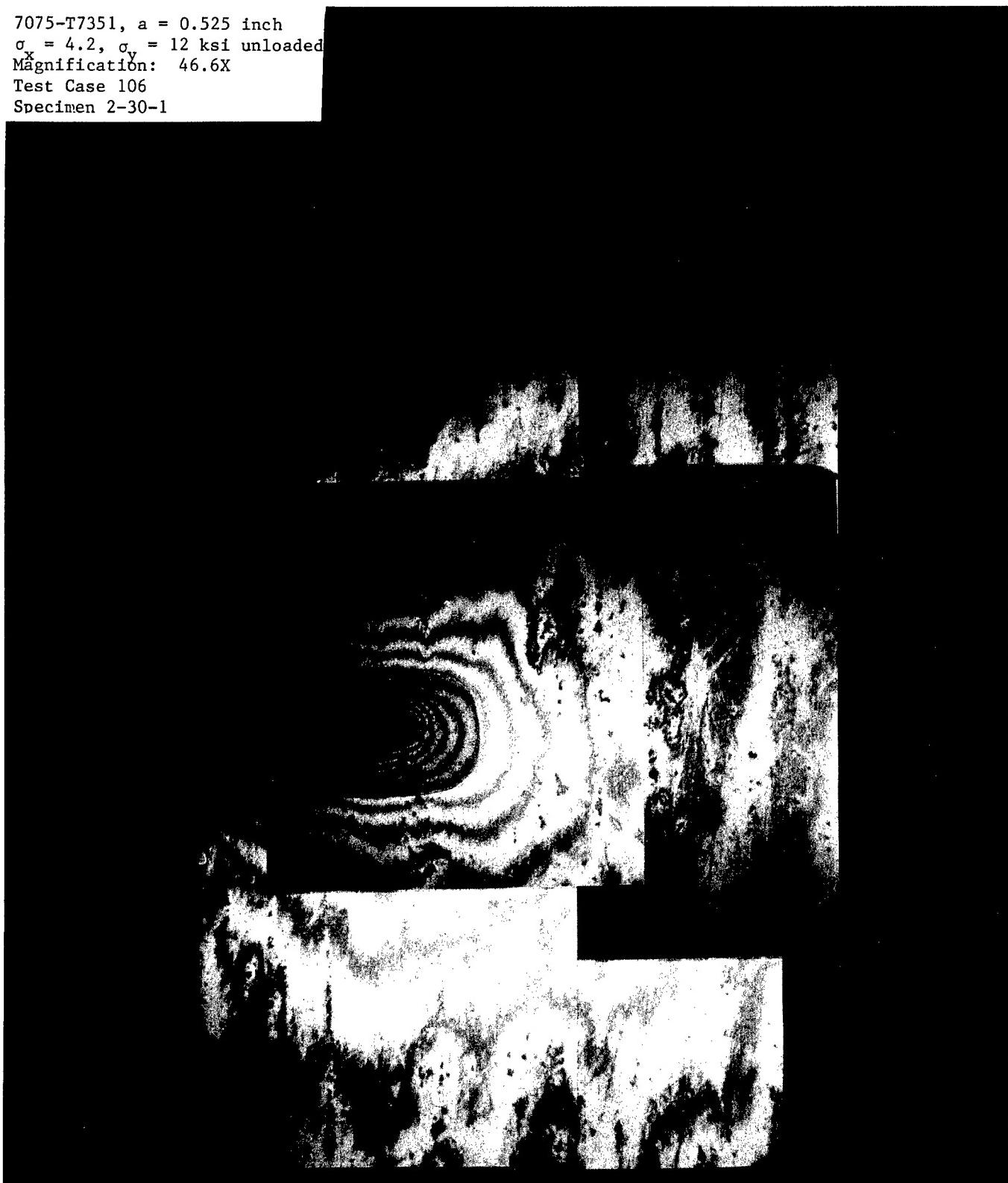


Figure 168. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 0.77$ inch
 $\sigma_x = 4.2$, $\sigma_y = 12$ ksi unloaded
Magnification: 44.2X
Test Case 106
Specimen 2-30-2

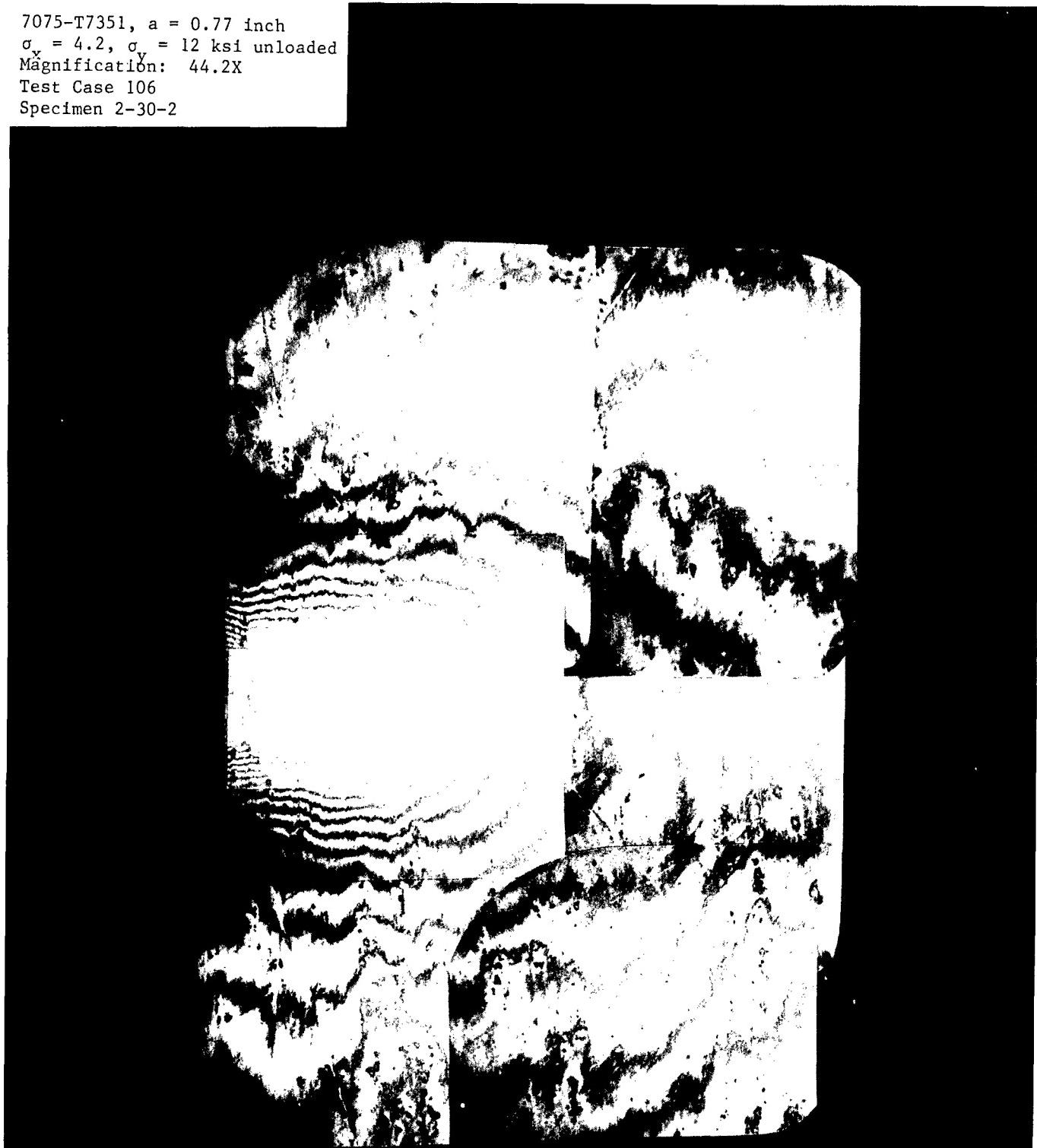


Figure 169. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen

7075-T7351, $a = 1.015$ inch
 $\sigma_{yy} = 4.2$, $\sigma_x = 12$ ksi unloaded
Magnification: 47.7X
Test Case 106
Specimen 2-30-3



Figure 170. Interferometry Photograph of an Unloaded Crack in a 7075-T7351 Specimen